Pea downy mildew distribution
&
Beneficial microbes

Lea Wiesel

Overview

- Pea downy mildew distribution in the UK – recent results and planned field trials

- Beneficial microbes – benefits of rhizobia and mycorrhiza and how to keep them happy

1st part

Pea downy mildew

Pea downy mildew

- Major disease in peas
- Soil and air borne
- Crop loss (primary), reduced pod fill and quality impact (secondary)
- Seed treatment – cost
- Varietal tolerance – depends on downy mildew race

Pea downy mildew diversity

- Aims:
  - Downy mildew race distribution
  - Varietal tolerance

- Results:
  - Culture collection
  - Field isolates are mixtures of several races
  - Two pea lines with strong resistance genes

AHDB HORTICULTURE

PGRO

Field trials 2016

- 6 locations
  - 20 combining pea varieties
  - Some vining pea varieties
  - 6 differential host lines

Please send downy mildew infected pea plants to PGRO

- Several whole plants
- Plastic bag ideally with some moist tissue
- Addressed to:

  Lea Wiesel
  Processors and Growers Research Organisation
  Great North Road
  Thornhaugh
  Peterborough
  PE8 6HJ

Bean downy mildew

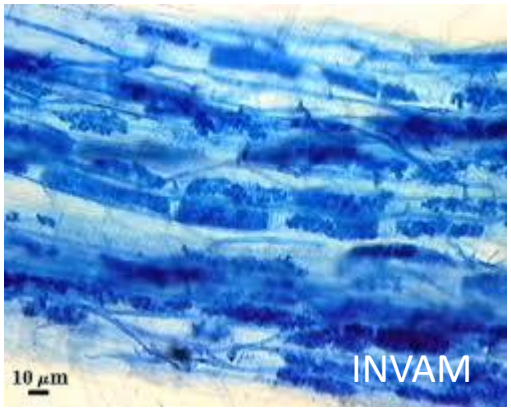
- Mostly spring beans
- Same species as pea downy mildew
- Differences in varietal resistance

- Results on pea downy mildew will probably also apply to bean downy mildew
- Breeding companies - screening

2nd part

Beneficial microbes

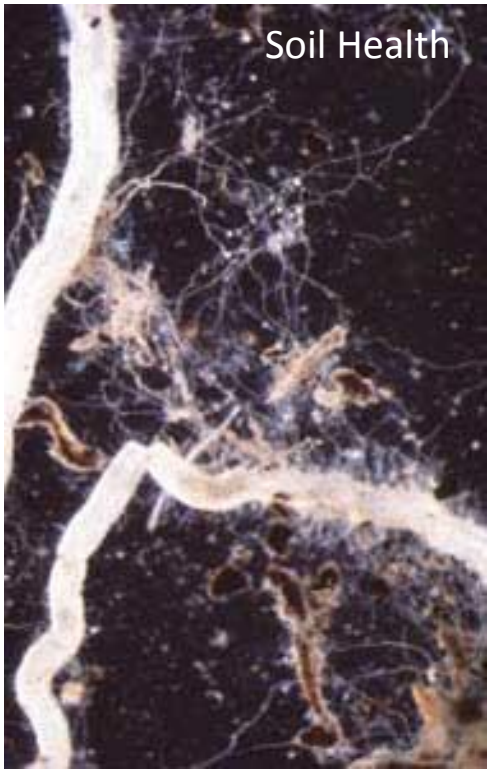
Arbuscular mycorrhiza



Colonisation of plant roots

Symbiotic relationship of plants and mycorrhizal fungi

Phosphorus delivery



Extended hyphal network

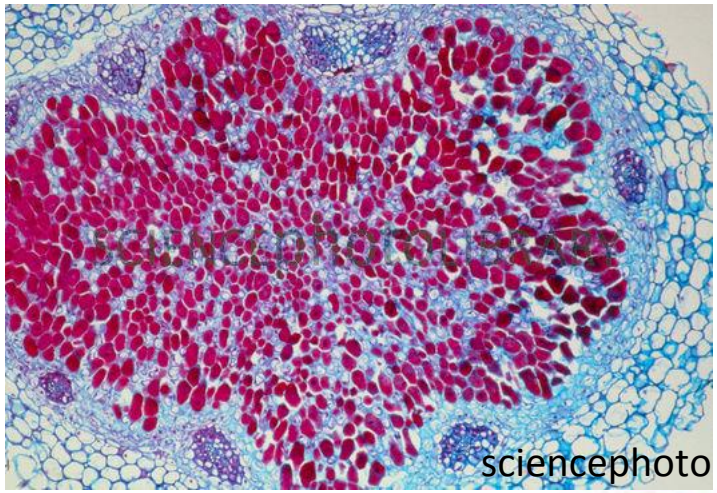
Benefits to legume crops

- Phosphorus delivery
- Greater surface area for nutrient uptake
- Increased plant growth
- Greater disease tolerance
- Increased drought tolerance
- Better soil aggregation
- Increased water holding capacity
- Reduced compaction
- Increased carbon sequestration

Rhizobia

Nodules on bean roots

Biological nitrogen fixation – most efficient way to supply nitrogen to legumes



Inside a nodule - leghaemoglobin

Benefits to legume crops

- Nitrogen fixation – no need for nitrogen fertilisation
- Increased plant growth
- Disease suppression

- Higher soil nitrogen for subsequent crop

How to keep them happy

- DON'T:
  - Frequent tillage
  - High fertiliser input
  - High pesticide input
  - Monocropping
  - Low pH

- DO:
  - Low inputs
  - Mixed rotation
  - Good soil structure
  - Healthy organic matter content
  - Cover cropping

Thank you

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