



# Stem nematode and field bean rotations

Becky Howard



# Stem nematode in field beans



- Slender, transparent free-living nematodes visible only under microscope – as the population multiplies in plant tissue they may be visible as a woolly mass
- Seed and soil-borne
- Two species – *Ditylenchus gigas* and *Ditylenchus dipsaci sensu stricto*
- *D. gigas* is the dominant UK species and has the greatest effect in faba beans
- Increased virulence in spring beans and this increases with repeated reproduction on the same genotype





- Up to 19,000 nematodes in a single seed
- Up to 100,000 nematodes in a mature stem

Stawniak, 2011

- Initially introduced via seed – desiccated nematodes may survive up to 3 years in seed – ‘anhydrobiotic wool’
- Easily transmitted by seed
- Environmental conditions influence incidence and impact
- Seed quality is affected







- Nematodes rehydrate when planted and invade plant tissue of the germinating bean
- Reproduce rapidly, producing eggs in the stem tissue
- As they feed in the plant tissue the plant produces giant cells that cause stem and leaf distortion

- Cool, humid or wet conditions favour field development
- In severe cases yield loss may be up to 70% and large patches may be affected
- In 2016 harvest season 25% seed samples tested at PGRO had stem nematode (10% in 2015, 20% in 2014)



# Host range

- ***Ditylenchus gigas* (dominant species in beans)**
  - ✓ Faba bean (main), pea, onion, vetch (secondary), buttercup, field bindweed, dead nettle, sterile oat (weeds)
- ***Ditylenchus dipsaci* (non-dominant species in beans)**
  - ✓ Over 500 host species including faba bean, clover, oats, onion, rye, buckwheat, hyacinth, lucerne, tulip, narcissus, sugar beet, carrot, turnip, pea, potato, maize, strawberry, OSR, common orache, chickweed, dead nettle, pale persicaria





# Management

- Preventative not curative – have seed tested and don't use seed that is infected
- Chemical nematicides are expensive and problematic – stem nematodes are present in soil and plant tissue and highly mobile
- Avoid movement of soil and plant tissue
- Crop rotation and weed control – avoid fields that have a history of stem nematode for 10 years and establish which species is present in order to select non-host crops



# Current research

- Management of *Ditylenchus* spp. in field beans (*Vicia faba* L) using biofumigant *Brassica* spp. and other allelopathic cover crops – PhD Harper Adams/ PGRO/ RAGT Seeds/ Joordens zaden
- PGRO project to establish the viability of stem nematode following feeding beans to cattle – there are some indications that stem nematode may survive in cattle manure

