Cabbage Whitefly

- Brassica whiteflies are sap-feeding Hemiptera which are largely immobile as larvae
- 3 to 4 overlapping generations from March to October
- Adults emerging from September will not lay eggs until spring

Life cycle of brassica whitefly in the UK.
Whiteflies in Brassica Production

- The main impact is through the contamination of produce by insect bodies, wax deposits and the growth of sooty moulds on honeydew excretion
- After 2000, whiteflies became a more significant pest of brassica production in some areas, particularly on kale
- Whiteflies can be difficult to target with non-systemic pesticides
- Kale is an ideal host for the whitefly throughout the year, due to its structure and long season

Whitefly Control

- Post-2000, organophosphates were withdrawn and resistance developed to pyrethroids in some areas (Springate & Colvin, 2012)
- Systemic insecticides (Movento®, Biscaya®) have overcome the problems of pyrethroid resistance and poor targeting to a substantial degree
- However, over-reliance on these products may lead to systemic resistance development and the resurgence of the pest
Biological Control

- Field surveys on wild hosts identified a number of natural enemies in UK
- Cultures of some of these were established at NRI
- Outdoor caged trials were carried out to assess potential for whitefly control
- The parasitoid wasp *Encarsia tricolor* showed the greatest potential
- Early introduction proved critical to limiting whitefly population growth

Results of a cage trial at NRI employing the parasitoid *Encarsia tricolor* (A, B, C) against whiteflies on kale. Arrows show time of release in each treatment.
FV406 - Brassicas: Integrated Management of Whitefly, *Aleyrodes proletella*

Objectives:

• Carry out a field trial to evaluate and compare integrated pest management (IPM) components for whitefly control
• Explore the potential of native biocontrol agents under field conditions
• Compare with early pesticide treatment, combinations and current practice
• Identify pipeline insecticides for resistance management rotations

Field Trial 2012

Plots set-up at Elsoms seeds R&D site, Spalding

• 32 plots, 81 plants per plot (9x9) with ~60cm spacing
• Treatments (4 replicate plots):
  A. Control (no insecticide/biocontrol)
  B. Netting Control
  C. Early *Encarsia* Release
  D. Early *Encarsia* Release + Late Movento
  E. Netting with Early *Encarsia* Release
  F. Early Movento
  G. Early HDCI 039 (coded product) (2 applications, 10 days apart)
  H. ‘Industry’ = Movento, Biscaya, Movento (approx. 1 month apart)
Field Trial 2012

- An AZO knapsack sprayer powered by compressed air with VP02F conventional nozzles was used for spray application.
- First insecticide applications were carried out after >50% of plants in all plots carried whitefly.
- Parasitoid release began once monitoring and a degree-day model predicted first late whitefly larval stages were present.
- Unexpected problems limited the yield of parasitoids, so these were released at the centre of plots to investigate dispersal.
- Monitoring – whitefly adults and eggs, larvae, parasitism and harvest quality.
- Sampled for native parasitoids on crops and in the surrounding area.

Calendar

- Preplanting
- 28 May
- 07–16 June
- 17–26 June
- 27–30 June
- 1 July
- 11 July
- 21 July
- 06 August
- 16 August
- 26 August
- 05 September
- 15 September
- 25 September
- 05 October
- Harvest

- Planting
- Pests affected
- First whiteflies >50% affected
- Encapsulation release begins
- 2nd insecticide
- 3rd insecticide
- Harvest
Adult Whiteflies

Eggs
Harvest - % cover estimate

- Percentage of leaf surface infested estimated using plastic grid pressed onto leaf
- Squares containing kale leaf counted as total leaf area
- Squares with whitefly larvae or egg circles counted as infested
- More reliable than simple visual estimate
- Every 2\textsuperscript{nd} leaf from 16\textsuperscript{th} leaf from base checked to give 10 leaves on 5 plants per plot

Preliminary Harvest Quality Data
Preliminary Results

- Whitefly numbers are higher on the trial than on crops in the area
- Lower adult numbers on caged plots suggesting continued immigration of whitefly adults onto site after cage erection
- All pesticide treatments produced significant reductions in adult and larval numbers
- Movento may have been applied too early to have maximum impact
- In the centre of plots, near the point of release, parasitoids had an impact similar to pesticides
- Parasitoids do occur in the region naturally but have no significant impact; inundative release would be necessary
Preliminary Conclusions

- Early intervention can provide long-term reductions in whitefly populations
- HDCI 039 will have value as a component of insecticide rotations for resistance management
- Parasitoids can have an impact but dispersal may be limited
- Identifying the site of whitefly development in the spring may provide the most efficient target for intervention with cultural, chemical or biological control methods
- Biological control may be a more acceptable intervention where the source is outside grower’s control e.g. Oil Seed Rape

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