

Insecticide Resistance Action Group

Minutes of the 36th meeting held at Warwick Crop Centre, Warwick

Wednesday, 6 April 2016

Hosted by Rosemary Collier

Adam, Nigel (Bayer CropScience)
Buss, David (EMR)
Collier, Rosemary (Warwick Crop Centre)
Collins, Larissa (Fera)
Fenton, Brian (SRUC)
Foster, Steve (Rothamsted Research: *Chair*)
Horgan, Alan (Certis)
Morris, Reuben (Frontier)
Nicholls, Caroline (AHDB Cereals and Oilseeds)
Pope, Tom (HAUC)
Powell, Vivian (AHDB)
Saunders, Pete (Syngenta)
Sparrow, Gemma (Adama)
Stevens, Mark (BBRO)
Wallwork, Chris (Agrii)
White, Sacha (ADAS: *Secretary*)

1. Welcome

IRAG welcomes Joe Helps from Rothamsted Research, Tony Fisher from CRD (attending in place of Sue Mattock), and Andrew Smooker who is taking over from Lynne Matthews as the BASF representative. IRAG thanks Lynne for her contributions to the group.

2. Apologies for absence

Bean, Chris (Zantra Ltd)
Cowgill, Sue (AHDB Potatoes)
Denholm, Ian (University of Hertfordshire)
Harris, Dilwyn (Dow AgroSciences)
Hill, Stuart (Frontier Agriculture Ltd)
Mattock, Sue (CRD)
Parker, Bill (AHDB)
Pickup, Jon (SASA)
Sisson, Adrian (DuPont)
Slater, Russell (Syngenta)

3. Minutes of last meeting

- CW has been working on the MOA resistance matrix. Need to develop the matrix arises from concern regarding the scale of pyrethroid use. However, restricting the use of pyrethroids may present issues for some growers, e.g. few alternatives to pyrethroids for control of carrot pests. If the resistance matrix could be extended to include registrations on specific crops it could represent a useful tool for growers and agronomists to identify alternatives to pyrethroids where resistance risk is deemed significant. This sort of tool is difficult to produce in Excel but LC thinks it may be possible to produce as a database.

Action: SW to check with BP that we have the latest version of the MOA matrix.

LC to look into whether a database version of the MOA matrix can be developed that uses queries to access information.

CW to pass on suggestions about where it can be expanded.

- SW contacted VP regarding continued involvement in the group. VP explained that where BP is not able to attend then she would, as it is important that AHDB Horticulture is represented.
- CN noted that emergency authorisations (EAs) were mistakenly referred to as EAMUs in the last minutes.

Action: SW to correct and recirculate.

- IRAG constitution circulated on 8 April 2016 but not received by all.

Action: SW to recirculate constitution.

- RC and BP attended the meeting on 20 November 2011 with MEP Anthea McIntyre. Pesticide resistance did feature in the EP Agriculture Committee's Initiative report on "Technological Solutions for Sustainable Agriculture in the EU" but at a fairly high level. If anyone would like to see the report please contact RC.

All other actions complete.

4. Feedback from IRAC

None this meeting.

5. Regulatory Issues

Nothing to report this meeting.

6. Update on research

Work at Rothamsted Research

SF provided an update on the three-year project PS2720 – ‘Combating Resistance to Aphicides in UK Aphid Pests’, which has been extended until 2017.

- *Myzus persicae*: super kdr likely to have been increasing between 2003 and 2011. RR have preserved samples of *M. persicae* from intervening years, which could be tested for the presence of super kdr. No Nic R⁺ or Nic R⁺⁺ detected in the UK. However, Russell Slater has informed us that neonicotinoid resistant R81T *M. persicae* have been identified on some protected vegetables in southern Spain. This is thought to be one of the first cases of the R81T *M. persicae* outside of peach. Demonstrating that these strains do have the capacity to move onto other crops, albeit slowly.
- CW commented that this makes the importation of Nic R⁺ / Nic R⁺⁺ much more likely. Rejected produce gets dumped outside pack houses in the UK. LC commented that inspectors are not geared up to check for *M. persicae* resistance to neonicotinoids. AH noted that *Tuta absoluta* entered the UK on imported tomatoes. NA suggested Defra should be made aware.

Action: SW to contact RS to find out which crop the R81T clone was detected on.

- Mean January/ February temperature in UK was fairly close to average, meaning that an early *M. persicae* migration was predicted. Most common clone in 2015 remained MACE/ super kdr with rarer genotypes making up a tiny proportion of the field population. An increase in susceptible/ susceptible clones was recorded. In Belgium and France MACE/ super kdr dominate. In Australia 85% of clones are MACE/ super kdr. Theory is that China is the source of resistance recombination. Rarer genotypes are more common in UK protected environments. CW commented that ornamentals are not usually grown from scratch in the UK. Importation of these is an important route into the country for *M. persicae*. In Scotland there are a genotypes with MACE, super Kdr and kdr and a diversity of clones. RC asked what to expect as selection pressure from pirimicarb goes down. SF replied that depending on the fitness cost of resistance, the frequency of MACE resistance could potentially go down.
- *Sitobion avenae*: grain aphid has kdr resistance to pyrethroids. Only sus/ kdr clones have been found. No kdr/ kdr clones have been detected. This is likely due to the asexual nature of the species in the UK. SF investigated whether this aphid is repelled by pyrethroids. Experiments set up in Rothamsted’s Field Simulator found that Sus/Sus were repelled but Sus/kdr were not. Tests also showed that Sus/ kdr clones were also not repelled by the alarm pheromones of conspecifics.

- *Psylliodes chrysocephalus*: resistance testing on adults in 2015 focused on the counties in the neonicotinoid derogation area. Order of LC50s remain the same as in 2015 (Suffolk > Cambridgeshire > Hertfordshire > Essex > Yorkshire > Norfolk). David Leaper (Agrii) has reported that pyrethroids retain ability to control larvae where resistance has been found in the adult population. LC added that Fera has spring larval survey data to the county level available. A correlation was found between larval numbers and °C above average.
- *Sitona lineatus*: resistance to pyrethroids was detected in the UK in 2015. The size of resistant populations varied but they were fairly widespread.

Work at Warwick Crop Centre

RC updated the group on research underway at the Warwick Crop Centre.

- Pesticide Usage Survey data shows that in vegetable crops increasing areas are being treated for caterpillars and aphids. Pyrethroids are being used heavily. A situation not helped by proposed label changes for pirimicarb. For the three main pests of carrot (carrot fly, aphids and cutworm) there are few treatment options and five insecticides accounted for the majority of use; lambda cyhalothrin, deltamethrin, pirimicarb, oxamyl and thiacloprid. Huge areas of OSR are treated with pyrethroids.
- Trials have shown that willow-carrot aphid was well controlled by Cruiser seed treatment and several coded products. Cruiser gave the best yield benefit. Aphox and Decis were not as effective.
- An AHDB Horticulture project is investigating module drenches for control of carrot root fly.
- Cabbage whitefly: AHDB doctoral student, Spencer Collins is investigating the development of cabbage whitefly infestations within crop, dispersal and colonisation patterns.
- AHDB Horticulture project on migrant Lepidoptera (Silver Y moth and diamond-back moth) investigating novel controls, remote monitoring methods and pheromone trapping.

AHDB/Defra/BBRO/PGRO funded resistance project 'Combating insecticide resistance in major UK pests' presentation by JH and SW

- SW described a novel trait-based insecticide resistance risk assessment scheme. The scheme is based on a model that predicts the time until first detection of resistance (FDR time). FDR time is the period between the year a pest is first

exposed to a MOA to the year resistance to an active with the same MOA is detected in the pest. A database of 125 cases of unique resistance cases occurring in countries belonging to EPPO was constructed. A statistical model was developed that identified the pest, pesticide and agronomic traits that best described the variation in FDR time. These traits were crop type, number of crop hosts, reproductive strategy, crop area and taxonomic Order. The model provides a framework for identifying insecticide/pest/crop combinations at high or low risk of resistance developing, even where the subject of the risk assessment is a novel MOA or pest or when there is no prior knowledge of resistance behaviour.

- JH presented the results of a model that quantifies the success of resistance management strategies, so that different options can be compared in a way that is relevant to practice. The results show that:
 - Mixtures are likely to result in longer effective lives for insecticide modes of action than alternation.
 - Resistance evolution is minimised by using the lowest dose at which commercially robust control can be obtained.
 - Adjusting the dose of mixture components to achieve the same combined efficacy as a solo product is a better resistance management strategy and is more likely to be acceptable to regulators.
 - Immigration rate is the primary pest trait that affects the effectiveness of resistance management strategies.

7. IRAG outputs

- Pollen beetle, cabbage stem flea beetle and grain aphid resistance management guidelines need updating to take account of changes to chlorpyrifos and pirimicarb registrations and include new information on resistance spread and mechanisms. Agreed that these will need minor revisions. RM noted that it may be helpful to where revisions are made the reasons for these are made clear. TF added that these guidelines are downloaded reasonably regularly from the website. SF made a request for grain aphid samples where control failures are suspected.
- Website update: Discussion regarding the host website of the IRAG website. Discussion instigated by proposed changes to the CRD website (the current host). Other RAGs are in favour of transferring hosting to AHDB. The CRD website is in a position to go live soon on the HSE website. If CRD continued to host the IRAG site it would be on a different part of the site and would become part of web-based community. VP noted that AHDB's ability to host the site needs to be confirmed. CW commented that a benefit of AHDB hosting is that AHDB are independent. RC added that this would fit well with other grower oriented services provided by AHDB such as Aphid News.

- All voted in favour of AHDB hosting the IRAG website (except CN and VP, who abstained).

Action: VP/CN to investigate AHDB's ability to host the RAG sites.

9. AOB

- CN informed the group that AHDB Cereals and Oilseeds have announced a call for new research on CSFB management. The details are available on the AHDB website.

10. Date and venue of next meeting

The 37th meeting of IRAG-UK will be hosted by RM at Frontier Agriculture, Sandy on 25 October 2016.