

Insecticide Resistance Action Group

Minutes of the 42nd meeting held at ADAS Boxworth

Wednesday, 24th April 2019

Hosted by Sacha White



Bailey, Andrew (Adama)
Collier, Rosemary (Warwick Crop Centre: *Chair*)
Cowgill, Sue (AHDB)
Denholm, Ian (University of Hertfordshire)
Evans, Andy (SRUC)
Foster, Steve
Hilton, Rebecca (Corteva Agriscience)
Jones, Gareth (FMC)
Mattock, Sue (CRD)
Mortlock, Philip (BASF)
Morris, Reuben (Frontier)
Nicholls, Caroline (AICC)
Parsons, Chris (Bayer CropScience)
Pope, Tom (HAU)
Shaw, Bethan (EMR)
Sisson, Adrian (Belchim)
Slater, Russell (Syngenta and IRAC representative)
Stevens, Mark (BBRO)
Wallwork, Chris (Agrii)

1. Welcome

IRAG welcomes Gareth Jones as the permanent representative for FMC following Steve Cranwell's retirement, Laurence Power who joins as the representative of Certis replacing Alan Horgan, Rebecca Hilton who replaces Dilwyn Harris as Corteva Agriscience's representative, Adrian Sisson who joins as a representative of Belchim, and Andy Evans who joins as a representative of SRUC. The Group would like to thank Steve and Alan for their contributions.

CN commented that she will be moving to Defra soon to take up a new role that will include the role of pesticides in crop production. RC suggested that she would email the group to ask if everyone is happy for CN to remain in group in her new role at Defra. CN commented that are AICC looking to find a replacement so that they continue to be

represented on the group. RC thanked SF for his time as chair and Steve Cranwell and Alan Horgan as group members.

- *Action: RC to email group to ask if everyone is happy for CN to stay as a member following her move to Defra.*

2. Apologies for absence

Collins, Larissa (Fera)
White, Sacha (ADAS: *Secretary*)

3. Minutes of last meeting

Minutes agreed.

Action: Members to email speaker suggestions for the APPG session to Rosemary Collier.

- *Action: RC reminded the group that the RAGs had come together to make the case that this session should be help. RC, however, drew the group's attention to the presentation given by Toby Bruce recently that has now led to a government enquiry looking at food security and the urgent need for research to underpin the development of sustainable crop protection. ID commented that the enquiry would take information from a range of sources and so the importance of resistance could be made within this enquiry. While it was noted that Toby would not be leading this enquiry it was felt that it would be useful to make contact with Toby before continuing efforts to make the case for an APPG session on resistance.*

Action: RC to contact Toby Bruce to find out more about the government enquiry that has come as a result of his presentation.

Action: Members to check and send any comments on the IRAG IRM guidance documents to Sacha White by end of January 2019. These are available at: <https://www.ahdb.org.uk/knowledge-library/irag>.

- *Action: SF commented that the guidance documents will need updating since, for example, loss of neonicotinoid seed treatments on outdoor grown crops in 2018.*

Action: Members to email additional updates to the IRAG IRM guidance documents taking into account recent withdrawals of some insecticides to Sacha White.

Action: Members to provide final comments on draft constitution by end of January 2019.

- *Action: Confirmed that constitution had been circulated for comment by end of January 2019.*

Action: RC to circulate updated constitution to the group and to put onto the IRAG website.

Action: SW to invite Andy Evans to join Group to replace Brian Fenton.

Action: Confirmed that AE had been invited and was attending his first IRAG meeting.

Action: SF to email group asking for nominations for the role of Chair and feedback on RC's nomination.

- Action: Confirmation that there was unanimous support for RC to become the next chair of IRAG.

4. Feedback from IRAC

RS gave the following update:

RS reminded the group that the role of IRAC is to communicate information and educate on insecticide resistance and insect-resistant traits. CW commented that “traits” should possibly part of the IRAG remit – not because the UK has GM traits to think about, but because there are cases of insect-resistant traits in crops which have been overcome by new biotypes of the pest, e.g. *Nasonovia* resistance in lettuce. RS continued that IRAC's work crosses both agriculture and public health and from grower level up to government level. The hardest element of IRAC's work is to implement resistance management but this is attempted on both a local and regional basis. Recent changes to the structure of IRAC include a reduction in the number of members with mergers and acquisitions having taken place. In addition there has been several other changes including updates to the mode of action classification.

The operating structure of IRAC International consists of Executive Committee made up of 10 member companies, although there are more companies associated with IRAC than this. IRAC International is broken down into several working groups. There are also regional IRAC groups.

Three new modes of actions have been added to the mode of action classification. Baculoviruses have now been grouped within the IRAC classification. More generally the biggest change has been to include biologicals within the IRAC mode of action classification. To cope with the inclusion of these biologicals some new ‘unknown’ classifications have been added. Where the biochemical mode of action is known the biological will be moved to a specific group. Pheromones are for the moment not included within the mode of action classification scheme as they are not biocidal in themselves. There is now a new booklet and mode of action classification poster. IRAC have produced a training manual, which is available from the website to download. This provides a useful teaching aid but RS asked that when using this or extracts from it to use the IRAC logo.

IRAC released a statement on the risk of resistance to nematicides developing. It is recognised that the risk of resistance developing is low but remains possible. The Nematode WG have developed a draft mode of action classification for nematicides.

IRAC have provided information on use of computer based modelling of insecticide resistance and how this can be applied to resistance management.

New IPM guidelines for lepidopteran pests have been produced by IRAC and this format is now being used to develop guidelines for other pests. The lepidopteran pest guidelines take the reader through the elements of resistance management including IPM. A poster has been produced specifically for fall armyworm where the focus is on the damage but the poster also considers resistance management. The *Tuta absoluta* team has been very active promoting resistance management to this pest through organising of workshops and producing new material. Having produced lots of new material, however, this team is no longer running.

IRAC have developed new material for *Myzus persicae* and specifically the R81t target site resistance to neonicotinoids. RS noted that neonicotinoid resistant aphids are now found on sugar beet throughout much of Europe, including Belgium.

RS noted that pollen beetle resistance monitoring has now been ongoing for 10 years. While pyrethroid resistance is well established this resistance monitoring activity also screens for resistance to other modes of action. RS confirmed that pyrethroid resistance across most of Europe is metabolic.

RS commented that there is now a poster for insecticide resistance in cabbage stem flea beetle.

IRAC Europe formed in 2018 and met for first time in March 2019. The focus of this group is on resistance management policy, advocacy and IRM implementation rather than a pest or active specific focus. Members include Adama, Bayer CS, Corteva, FMC, Nihon Nohyaku, Syngenta and Sumitomo. A meeting of group is planned for September 2019. The aims of the group include harmonised assessment of unmitigated resistance risk for European pest species i.e. draw up a list of pests and then all companies to agree on the resistance risk. A second aim of the group is to harmonise resistance risk analysis as part of the registration process, which could be by each registration zone and would avoid each company doing a separate analysis for their product. ID and SM commented that EPPO are developing a similar database. RS felt that the IRAC database would provide a useful addition to the EPPO database. Other work of the group will be to promote IRM adoption through publication of grower-focused communications and a European version of the MoA poster.

RS explained that he recently stepped down as chair of IRAC but that he remains very active within IRAC and so will continue to provide updates to IRAG.

Action: RS to circulate slides of his presentation to the group.

5. Regulatory Issues

SM gave the following update:

- A SM commented the CRD EU Brexit team has undertaken a significant amount of work around Brexit preparing for the different scenarios currently being considered, and communicating regularly with stakeholders via various events
- Regarding MoA labelling SM explained that in the next month CRD will be going out to industry with details on putting this information on product labels. MoA labelling will be a requirement but a light touch will be taken in terms of how each company does this.
- New CRD guidance documents have been produced, these are for cereals and maize with the pest complexes updated. SM commented that there are also documents for OSR and vegetable brassicas as well as one on turf. This information will be put onto the HSE website and SM will provide links to these. Pests are categorised as being 'major' or 'minor', which relates to the number of trials that are required for registration purposes. A more general crop guide will also be made available. The guide so far completed is for potatoes and includes pests but also the agronomy around this crop to provide more context. This potato guide is a model that will be used for other crops. SM noted that CRD are mindful that there is already excellent information available through AHDB.
- ID commented on an impact paper reviewing the loss of chemistry. SM commented that this is well underway and the purpose of this paper is to raise awareness within Defra of the issues around crop protection. SM agreed to make at least some of this information available.

Action: SM to circulate links to documents mentioned in her presentation and that she would welcome any comments on these.

6. Update on research

Work at Rothamsted Research

SF provided an update on PS2720 project – 'Monitoring and managing insecticide resistance in UK Pests'. Project funding ends this year so further funding needed.

Myzus persicae (peach-potato aphid):

- SF reported that for neonicotinoids there is data from 2004 looking for low levels of resistance to this group of insecticides. The good news is that there is no evidence of this form of resistance increasing over this period and there is no evidence of Nic-R+ and Nic-R++ being found in the UK. The Nic-R++ aphids are, however, spreading on herbaceous hosts and are found in northern Africa and as far north as Belgium. With neonicotinoid bans now in place, virus yellows in sugar beet and BYDV in cereals are likely to be more common in the future. From

- screens completed testing different groups of insecticide there is no evidence of resistance to pymetrozine but this active is being lost due to concerns about watercourse contamination. There is no evidence of resistance increasing to flonicamid but there are some anecdotal reports of control problems with this active through Europe. For spirotetramat, again no evidence of resistance developing. For cyantraniliprole, although not used against aphids, when tested in screening experiments there is no evidence of resistance developing.
- MACE resistance remains common, approximately 70% of samples found to have this form of resistance, kdr resistance is less common at 20% of samples but super kdr is common with around 70% with this form of resistance. Super clones of *Myzus persicae* carry both MACE and super kdr; now clone W is emerging as the common clone with less P and no O found in recent sampling. W has the same forms of resistance as both P and O but there is no information on virus transmission by the W clone available.
 - CP offered to check if he can circulate Bayer information on spread of neonicotinoid resistant aphids through Europe.
 - SF commented on the differences between field and protected crops. SF noted that while esterase resistance is not found in field-grown crops in the UK it is often found in protected crops, suggesting perhaps that here aphids have been imported on plant material.
 - Data for Scotland looks very similar to England in terms of resistance forms found and it is likely that the W clone dominates as in England.

Sitobion avenae:

- For *Sitobion avenae* SF explained that some samples have been tested and confirmed to have kdr resistance but that there is still no sign of a shift to homozygote forms. It appears that there is one super-clone of *S. avenae* but there is also evidence that this super-clone does produce sexual forms in autumn.

Cabbage stem flea beetle:

- CSFB monitoring continues with evidence of increasing resistance problems.

Other pests

- Pollen beetle resistance monitoring continues.
- SF presented work screening *Plutella xylostella* for resistance in the UK to pyrethroids and susceptibility to cyantraniliprole based on samples collected in 2016.
- Onion thrips (*Thrips tabaci*) in which there is already known pyrethroid resistance is now also resistant to spinosad.
- SF reported work looking at willow-carrot aphid where there is some evidence of resistance of pyrethroid resistance but currently there is a lack of good baseline data to base this on.

- SF reminded the group about the Resistance '19 meeting September at Rothamsted Research.

Action: SF to circulate slides from his presentation to the group.

Work at Warwick Crop Centre

RC gave the following update on research underway at Warwick Crop Centre.

SceptrePlus:

- Of the work focusing on aphid pests, this has mainly been looking at *Myzus persicae*, currant-lettuce aphid and willow-carrot aphid. The work has looked at both knockdown and persistence of products being screened.
- Work in SceptrePlus has also screened products against *Tuta absoluta* in dipping assays to assess if there were products that would control larvae inside leaves and so leaves were dipped either before or after inoculations with pest.
- Vegetable and salad targets within SceptrePlus have included bean seed fly, lettuce aphids, particularly lettuce root aphid where there is a need to find a replacement for thiamethoxam. Similarly, for brassica aphids there is a need to find a replacement for thiamethoxam.

Silver Y moth:

- RC commented that there was a large migration of silver Y moths in 2018, which caused problems for lettuce growers. In bioassays completed on individuals collected from this migration there was no evidence of resistance to pyrethroids, although it was noted that relatively few individuals were tested.

Fly IPM:

- European ERANET project on developing IPM strategy for root-feeding flies – cabbage root fly, carrot fly etc. Looking at biological, physical and behavioural (trap crops/repellents) approaches.

Virus control in carrots:

- New project on virus in carrot (AHDB) led by Adrian Fox (Fera) – implications for aphid management.

Work at NIAB EMR

BS gave an update on spotted wing drosophila (SWD) research at NIAB EMR.

- BS presented work on SWD and the importance of insecticide application timing. The work presented by BS tested responses to cyantraniliprole, pyrethrum, lambda-cyhalothrin and spinosad. Results presented showed that at low concentrations for some of the insecticides tested there was actually an increase

in egg laying and at while higher concentrations egg laying by surviving individuals is initially reduced it may recover. Indeed, for spinosad surviving females laid the same numbers of viable eggs as controls, although few of these eggs developed successfully. BS commented that these results were of concern in terms of future development of insecticide resistance in this pest and although there isn't insecticide resistance in Europe there is now spinosad resistance in California. These data may form the basis of a larger study using populations exposed to insecticides in the field as the current study used a lab culture that had not previously been exposed to insecticides.

7. IRAG outputs

IRAG constitution

- See comments and action point for IRAG IRM guidance under Minutes of Last Meeting.
- There was a discussion about the IRAG resistance matrix in which CW confirmed that nothing more had been done to the matrix in the last couple of years. It was agreed that it would be worth looking again at the matrix and CW agreed to do this. ID commented that a narrative to the database was needed and that this may feed into the IRAC database that RS described.
- There was a discussion on the risk of resistance to biopesticides where multiple applications are recommended. It was generally agreed that the risk of resistance may or may not be low as many claim but that this needs to be considered and RS agreed to raise this within IRAC.

9. AOB

IRAG membership:

- RC asked for volunteers to take over from SW as secretary.
- There was a comment that the IRAC mode of action classification would be useful in a UK specific form, which led to a discussion as to whether the European version would be enough.
- TP commented that a new AHDB funded PhD studentship is starting in the autumn looking at the potential of biopesticides to control CSFB. TP asked that anyone interesting in supplying products to be included in this project to contact him.

Action: RC to email group asking for nominations for the role of Secretary.

10. Date and venue of next meeting

Corteva to host at Wellesbourne, Warwickshire on 12 November 2019.