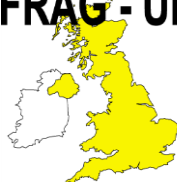


Fungicide Resistance Action Group-UK

FRAG - UK



FRAG-UK 43rd Meeting

10:30, Friday 16th March 2018

Syngenta, CPC4 Capital Park, Fulbourn, Cambridge, CB21 5XE

Present

Chairman Dr F Burnett

Secretary Mr P Ashby (HSE/CRD)

Members Mr M Ashworth (DuPont)
Dr K Maguire (Bayer CropScience)
Dr P Gosling (AHDB)
Dr J Turner (FERA)
Mr B McKeown (BASF)
Mr B Clark (NIAB -TAG)
Mr M Thompson (AICC)
Mr N Watson (Hutchinsons)
Mr A Bailey (Adama)
Dr B Fraaije (Rothamsted)
Mr R Dyason (Nu Farm)
Dr N Paveley (ADAS)
Dr D Ellerton (Hutchinsons)
Dr L Cooke (Specialist/QUB)
Mr A Jones (Arysta)
Dr T Fleming (AFBI)
Mr A Horgan (Certis)
Mr E Bingham (Belchim)

A copy of the current FRAC anti-trust guidelines was circulated during the meeting. BASIS qualified members were invited to sign the circulated attendance sheet if they wished to claim the available points.

1. APOLOGIES FOR ABSENCE

Dr G Kemmitt (FRAC), Dr S Kildea (Teagasc), Mr E Bingham (Belchim), Dr M McPherson, Mr J Sellars (DAS)

2. INTRODUCTION OF NEW MEMBERS/VISITORS

The Chair introduced Dr T Fleming who replaces Dr R O'Hanlon as the NI representative.

Post-meeting note. Shortly after the meeting Dr G M McPherson retired from STC and confirmed that he no longer wished to continue as a member of FRAG-UK

ACTION: A replacement independent Horticultural specialist to be sought.

3. NOTICE OF ANY OTHER BUSINESS

4. CONFIRMATION OF PREVIOUS MINUTES

KM requested a change to the minutes – 6.4 SDHI OSR Restrictions

ACTION: Kerry Can you please clarify this request.

BC suggested that a comment attributed to Frank Van den Bosch, that 'Growers usually apply too much fungicide' be removed as it was inaccurate.

ACTION: Sec to amend Section 8.1 accordingly. Done

Jason requested that it be noted that the shift in sensitivity in *M graminicola* to SDHIs had not been observed where chlorothalonil had been applied.

ACTION: Sec to amend Section 10 accordingly. Done

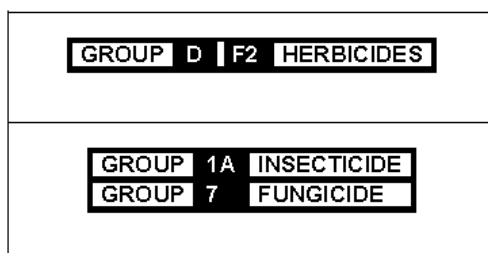
5. ACTIONS FROM PREVIOUS MEETINGS

5.2 Resistance definitions.

BC has discussed with FRAC who recognize that some of their publications are contradictory. FRAC will discuss further.

5.3 Use of FRAC MOA Codes on product labels.

The RAGs had submitted a proposal to CRD on this topic. CRD met with CPA representatives on 7th March. Though there needs to be further discussion with generic manufacturers CPA were broadly supportive. The CLI proposal is for a very simple system (see graphic)



CRD are supportive of this simple system. This system has been widely adopted globally. It would require no change in resistance management strategies.

BM was concerned about the practicalities of adding more information to an already crowded label. KM expressed a similar concern, as did JT who noted that it was not simple to change production cycles and suggested CRD needed to consult more widely.

RD and DE suggested the label was the wrong place to have this information as labels are not consulted at the fungicide programme planning stage. Though DE did say that this information was useful and Hutchinsons were already operating a similar system with their agronomists.

KM suggested that if MOA as well as group were added other information could be removed from the label.

BC was concerned that 'group' was confusing and not informative as cross resistance within FRAC group was not always complete. Used incorrectly this could result in perfectly acceptable mixtures being restricted. BM was similarly concerned, particularly with mixtures.

MA suggested that the way this is communicated and used will be important to get right.

The CLI propose to implement this by 2023. There was concern that this change be co-ordinated. KM was concerned if some labels have this some do not it will only add confusion, but that it is better done sooner rather than later. JT was concerned that production runs are not in sync and so doing everything together would be difficult. Sec suggested on-line labels could be changed simply and in a short timeframe, with physical labels changed as and when convenient.

BC was still concerned that 'Group' was not defined and so is confusing.

ACTION: Sec to provide update at next meeting

5.4 Maximum total dose for chlorothalonil

Sec briefly recapped the case for a maximum total dose rather than number of applications for chlorothalonil, discussed at the last meeting. From a regulatory standpoint the change should be relatively straight forward. However, Sec was concerned that this change could result in lower doses being used, compromising anti-resistance. If the change is made clear guidance needs to accompany it.

BM queried if there was enough protection at less than 1 litre (500g/ha). Sec suggested no. NP indicated that 1 litre gave good efficacy against *Z tritici* so would also give good protection to other chemistry. Sec indicated that there is currently no overall maximum dose across all products so alternative products can be used. Chair indicated that the concern is that where mixtures are being used in order to access the ctl, the other chemistry is being applied unnecessarily, which is clearly bad practice.

BC indicated that WFD may overtake this as ctl use is likely to be restricted. JT suggested that repeated and lengthy delays in decisions regarding the WFD mean that waiting for a steer from WFD would be unwise. MA suggested that even if WFD restricts use the proposed change would add useful flexibility and we should go ahead.

Sec was not convinced that the change would not lead to bad practice i.e. reduced doses of ctl being used. NP pointed out that there is no multisite being used in more than half of T2 applications in wheat already and KM was concerned that too little ctl is being used. MA and BC indicated that current labels do not address Sec concerns anyway. Sec noted that

FRAG-UK was supportive of the change. The change could be offered to companies and would take a few months to get through the system.

If the change is made there will need to be clear messaging around the change so that it does not have negative consequences.

5.5 Advisory restriction for SDHI products on oilseed rape

CRD is of the opinion that statutory restrictions are not required. If companies want to remove the statutory restrictions on current labels and replace them with advisory limits CRD is content for this to happen.

MA asked about other MOA given that no SDHI resistance has been found. These do not even have an advisory restriction. PG/NP pointed out that boscalid resistance has been found in Sclerotinia in the UK and France. Sec indicated that the current position (advisory limit) was a compromise. JT suggested that restrictions were based on risk. Waiting for resistance to be detected before imposing restrictions was not advisable. KM suggested all SDHI products should contain an advisory limit. The current situation does not give a level playing field to all products and some labels refer the reader to FRAG, but FRAG does not have a clear position on SDHIs in OSR. MA suggested that if we lose chemistry more than 2 SDHIs may be needed on OSR to maintain disease control. Chair suggested FRAG maintain a 2 application advisory limit and Sec agreed this was the regulators view.

5.6 see item 6.2

5.7 Fiona to revise FRAG-UK Resistant pathogens list
Under progress

Post-meeting note: Sec has circulated a list of potential additions to the current (2012) list for discussion at the next meeting.

6. FRAG-UK GUIDELINES

6.1 Cereals

BC has made several changes and re-written the Ramularia section and will circulate for comment. PG indicated that final copy was required by AHDB for printing by 16th May.

ACTION: Bill to circulate final version

Post meeting note: 2018 version completed and on AHDB/FRAG-UK website

6.2 Potato Late Blight

LC thanked everyone (particularly Martin McPherson and Faye Ritchie) for their helpful comments in updating the guide. She was still waiting on comments about fluazinam resistance from the data owners. The 37_A2 clone occurs in a mixed population and so fluazinam used in mixture can still be part of blight control programmes, even for late season. Dutch data, where 37_A2 has been present for several years indicate its level in the population is likely to stabilise. Ed Bingham (Belchim) will work with Louise to finalise the wording on 37_A2 and fluazinam.

JT presented Syngenta data showing that 37_A2 is sensitive to metalaxyl, though only one isolate has been tested. In contrast most 13_A2 is metalaxyl resistant, though a small number of isolates are very sensitive. Syngenta will look again at its data to see if they can say any more about phenylamide sensitivity. There is Dutch data, but it is commercially confidential.

NP expressed concern about the potato guide in cases where the guide has copied from the product label, where the product label is giving information FRAG-UK would not consider good practice e.g. where multiple applications are advised, making up a large proportion of the whole programme. MA asked if the proportion of the spray programme was important for driving resistance. NP indicated that it is not, it is the number of sprays that is important. NP offered to discuss the proposed deletion of reference to the 'proportion of sprays' with any manufacturers.

ACTION: Comments to Louise by Easter.

Post-meeting note: Revised version published on AHDB/FRAG website.

7. PRESENTATIONS

7.1 'Fungicide Futures': Update on resistance management campaign

PG gave an update on the joint AHDB/FRAG Fungicide Futures initiative, outlining plans for 2018, including the fact that the initiative has been chosen by AHDB as one of three key themes for its summer events program and asking for feedback on proposed publications.

There was a generally supportive view, but concern that messaging was too bland, too close to current FRAG guidance and was not adding enough to current FRAG activity. KM was concerned that the crop as a whole was not being considered, as disease does not happen in isolation. It was suggested that clear punchy messages were needed to make an impact.

MA suggested that some clear messaging around MOA groups would be helpful, using a hierarchy of appropriate actions e.g. Don't do/Avoid/Helpful etc.

JT asked what was the long-term plan and suggested some longer term planning of messages would be helpful. PG indicated that the long-term plan and aim was to raise the FRAG-UK profile, and put resistance management at the heart of fungicide planning and then to hand over to FRAG-UK after 5 years. PG indicated it should be possible to put together a 5 year plan of messages. The aim for 2018 was to formulate and agree messages within FRAG and then bring in wider industry, such as distribution.

MT expressed a concern that there was a conflict between maintaining efficacy and good resistance management and messages need to take account of this.

ACTION: Members to feed back on proposed publications and messages by the middle of April.

8. UPDATE ON CURRENT RESEARCH

8.1 Update on latest azole and SDHI sensitivity test results of *Zymoseptoria tritici* isolates (BF)

An apparent pause in azole sensitivity shifts over the last three years seems to have ended with a large shift in epoxiconazole and prothioconazole sensitivity between 2017 and early season 2018 testing at Rothamsted (single field associated with an increase in the proportion of S524T in the population). Shifts for prochloraz and tebuconazole were much smaller.

No SDHI mutations before 2015. Four mutations were detected in 2016 (C-T79W, C-W80S, C-N86S, C-H152R), though none were highly resistant.

Early 2018 monitoring at Rothamsted indicates a large shift in the sensitivity to bixafen, with more than 50% of the population showing mutations.

MT made the point that there is a need to correlate the lab. sensitivity testing to field performance so that a clearer message can be given to advisors and farmers, along the lines of the information being provided by Teagasc.

In response to a question on whether it was time for advisors to increase the dose of SDHI they recommend (whilst remaining within the statutory limits) NP considered that the situation had not yet reached that point.

8.2 Research update

NP presented results of the project *Managing resistance evolving concurrently against two or more modes of action, to extend the effective life of new fungicides*. The objectives are to achieve a low resistance selection for the single site MOA's whilst retaining their high efficacy. These indicate that splitting the SDHI dose but maintaining the overall dose was not as detrimental as expected for resistance selection. This has implications for protecting other modes of action, but it is only one years result and has some caveats, such as the fact a single SDHI (isopyrazam) was used and the result may be different with other SDHIs with greater efficacy. The project is also looking at varietal tolerance using low *Z tritici* resistant varieties.

MT asked what the implications for disease control in 2018 are. NP suggested no change based on a single years data.

More generally, data from Crop Monitor indicates less than 50% of the wheat area treated received a multisite (CTL) and that for wheat half of the area treated with an SDHI is reliant upon the azole for it's protection. NP suggested that the T2 timing was where the message to include a multisite should be focused , after to only use e an SDHI if needed, but that fundamentally the advice does not change. The response of growers to resistance is often to increase the dose, but this is the worst option as it accelerates selection for resistance.

DE suggested that the T1 message had to be linked to risk, but SDHIs at T1 were not always needed. JT indicated that robust programmes containing azole, SDHI and multisite had performed well in Ireland last year in the face of high frequencies of moderately resistant SDHI mutants.

9. RESISTANCE IN THE UK

9.1 Cereals

JT presented results from Syngenta.

Monitoring of *Z tritici* had been done in 21 countries in Europe in 2017. Solatenol showed a similar pattern to isopyrazam. Shifts in SDHI sensitivity were significant in GB, IRE, FR and D only. C-H152R was detected in D, UK and IRE only, generally at 5-10% (Germany up to 30%). Mutation frequency is increasing year to year, but slowly, though at some sites in Ireland close to 100% of isolates contained the T79N mutation. T79N is at a much lower frequency in UK and D.

DMI sensitivity is stable since 2015 and QoI insensitivity (G143A) is widespread across Europe but it remains sensitive in Eastern and Southern Europe.

Net blotch populations now contain a high frequency of SDH mutations at most sites in the UK. The T79R mutation has increased in frequency a lot, while the other mutations have

increased more slowly. The UK pattern is slightly different, with T79R not so dominant. The largest shifts have been in UK, FR, B and D, with a shift in field performance.

For the QoI's the F129L mutation in net blotch increased to moderate levels in 2017 across NW Europe (D, FR, UK and DN). Increasingly populations with both SDH and QoI mutations have been detected.

In Ramularia the H146R SDH mutation is now widespread in Europe and impacting field performance, with lower frequency of H153R (field performance less impacted).

BM presented results from BASF

In *Z. tritici* epoxiconazole sensitivity had shifted in 2017 in GB, FR and D, though metconazole sensitivity has been stable since 2014. SDH mutations continued to increase in UK, NL, D, IRE, with T79R dominating in IRE. In the rest of Europe there was a near equal split between T79N and N86S.

Net blotch SDH mutation frequency increased in FR (G79N dominant) and D (more mixed population), but not in the UK and the frequency of mutations was much lower in general than suggested by the Syngenta monitoring. BASF monitoring suggests a fully sensitive situation for the QoI's in Eastern and Southern Europe but an increase in the less well controlled mutations in Western Europe. In contrast to the Syngenta monitoring a reduction in the proportion of F129L mutations was reported, with a fall in frequency in the UK, an increase in D and a stable situation in FR.

MA on behalf of Dow DuPont indicated their monitoring had produced similar results to Syngenta, but these were not presented due to time pressure in the meeting but agreed to provide them later. KM (for BCS) agreed to do the same.

ACTION: Mike and Kerry to provide update at the next meeting

PG asked about DMI resistance in Net blotch reported in the FRAC DMI group minutes and if there were any implications for the UK, but none of the company representatives were aware of these results.

9.2 Potato blight sensitivity to fluazinam in the UK

Covered in 6.2

9.3 Strawberries:

JT reported results from Syngenta monitoring in Europe of *Botrytis cinerea* (no UK data available). Cyprodinil resistance is stable since 2009, with around 50% of the population tested, but the impact on field control is uncertain. There are two different genes conferring resistance, it is possible to have one or the other or both, but they are not additive.

KM reported results from Bayer monitoring of fluopyram sensitivity in *Botrytis* on strawberries and raspberries. Monitoring has been done in UK, D and FR. 139 samples of UK strawberries and raspberries from 20 locations in 2016, analysed showing

BM reported 2016 results from BASF strawberry monitoring. Resistance to pyrimethanil is at a high level in Europe but stable. Resistance to boscalid is at a high level but with significant heterogeneity (30-70%), with a higher frequency of resistance in N. Europe, which has been increasingly slowly since 2008. BM also reported instances of multiple resistance.

BF reported results of Rothamsted monitoring. All UK strawberry *Botrytis* isolates are QoI resistant, with moderate to high resistance to boscalid and cyprodinil in tested isolates. Resistance to carbendazim is site specific.

Sec reported concern is due to high frequencies of fungicide residues detected in some UK strawberries, though all are below the MRL. Investigations have resulted in growers suggesting they need for multiple applications to combat resistance and are constraints imposed by label restrictions. Growers may be applying fungicides that are ineffective, requiring repeat applications. Guidance is needed. Though Red Tractor provides guidance on controlling disease and minimising residues it does not cover resistance.

Post-meeting note – AHDB Hort have two publications of relevance on Botrytis and powdery mildew control. Both include some information on resistance management.

ACTION: Members to consider a new FRAG-UK Soft fruit resistance guideline.

10. UPDATE FROM COMPANIES

None

11. FRAG-UK WEBSITE UPDATE

Moved to next meeting

12. LIAISON WITH OTHER GROUPS

None

13. FUTURE EVENTS AND PUBLICITY

Covered elsewhere

14. AOB

Sec noted that the FRAG-UK list of resistant organisms has not been updated since 2012.

ACTION Sec to propose updates and send to Chair for consideration

Sec noted that feedback from FRAC has been missing recently.

ACTION Sec to contact GK

15. DATE AND VENUE OF NEXT MEETING

TBC