Guidance on how the potato industry should respond to reduced fluazinam sensitivity in late blight populations: summary

1. Changes in late blight sensitivity to fluazinam

A newly prevalent strain of the potato blight pathogen, *P. infestans,* in England, named genotype 37_A2, is less sensitive to fluazinam than other established GB strains. The prevalence of this genotype increased substantially between 2016 and 2017, from 3% to 24% of the samples collected by blight scouts as part of AHDB's "Fight Against Blight" which monitors the GB *P. infestans* population. The efficacy of fluazinam is likely to be affected further if the frequency of 37_A2 continues to increase. The likelihood of further increase is considered in the next section. Currently there are blight fungicide active ingredients (a.i.s) with 13 different modes of action available in the UK, therefore resistance to fluazinam should not be a major issue for potato production, provided there is sufficient diversity in the use of the a.i.s. However, in the absence of fluazinam there remain available only two modes of action for highly effective tuber blight control. Both of these should be considered as also being at risk of fungicide resistance. Clearly, robust anti-resistance management is a pressing requirement. There is concern that fungicide a.i.s representing those two modes of action (i.e. fluopicolide, cyazofamid and amisulbrom) won't provide a sufficiently long period of tuber protection against blight for some crops, because of the label restrictions on the maximum number of applications per crop.

2. Changes in the P. infestans *population*

The available evidence suggests that 37_A2 is associated with decreased sensitivity to fluazinam and has comparable aggressiveness to another dominant genotype in GB, 6_A1. Consequently the proportion of 37_A2 in the population is likely to increase if fluazinam is used, but may remain high even if no fluazinam-based products are being applied. Part of the *P. infestans* population in Scotland is now most probably reproducing sexually, making it more likely that new strains will arise which combine some degree of fluazinam insensitivity with other characteristics, such as virulence against particular blight disease resistance genes in potato varieties.

3. Reducing the risk of poor control

In areas where 37_A2 has already been confirmed, there is a risk of less effective foliar blight control and increased risk of tuber infection. These risks should be mitigated by using products other than fluazinam. In areas where 37_A2 has <u>not</u> been confirmed, the following risk factors should be fully considered before the use of fluazinam:

- Geographical location of crops, i.e. 37_A2 confirmed in region or not. Consider if sampling intensity in the area is sufficient to avoid false negatives (i.e. that 37_A2 has not been detected, but is in fact present).
- Seed source used for your crops and others in the locality. Did it originate from a region in which 37_A2 has been confirmed? This comment applies to imported seed plus UK seed
- Is fluazinam needed for *Sclerotinia* control?
- Is the crop to be desiccated and stored (and hence at higher risk from soft rots originating from blighted tubers), or harvested green top and marketed immediately?
- Check who carries the risk if fluazinam is used and there is loss of control linked to resistance.

4. Implications for control of Sclerotinia *stem rot and powdery scab in potato using fluazinam*

Fluazinam can provide incidental control of *Sclerotinia* stem rot and is sometimes applied to the soil for the control of powdery scab. The efficacy of fluazinam against these pathogens is not affected by the sensitivity of blight strains. However, if application of fluazinam targeted at other pathogens also exposes *P. infestans* to fluazinam, then this could increase selection for insensitive strains of *P. infestans*. Such exposure could, in principle, occur from either foliar application or exposure of *P. infestans* from blighted seed tubers to fluazinam applied to the soil. If, in future, insensitivity in *P. infestans* affects the availability or economics of using fluazinam in potatoes, then other control measures for *Sclerotinia* are likely to become more important. Examples of such measures are : extending rotations, limiting the number of crops in the rotation that are susceptible to *Sclerotinia* and providing good control of *Sclerotinia* by use of fungicides in other host crops (e.g. oilseed rape, peas and carrots).

5. Recommendations

- Implement cultural controls
- Prevent oospores contributing to late blight epidemiology by having long rotations (at least 1 in 5 and free from volunteers) and also by maintaining a high level of late blight control
- In areas in which genotype 37_A2 has been confirmed, there is increased risk of crop damage due to late blight if fluazinam is used and proves ineffective.
- In regions thought to be free from 37_A2 (but be aware of the potential for a rapid change in status) fully consider the risk of using fluazinam
- Plan an appropriate strategy across the entire fungicide programme which will protect foliage and tubers from late blight, and provide good resistance management
- Place much greater emphasis on modes of action when choosing products. Make full use of the different modes of action available; especially during the tuber protection phase of growth
- Using mixtures of fungicides with different modes of action (tank mixes or co-formulations) **and** alternating products throughout the fungicide programme are both effective resistance management strategies.
- Ensure mixing partners are used at doses that provide similar efficacy and persistence
- Recent research in The Netherlands, with the less aggressive fluazinam insensitive genotype 33_A2, found that cymoxanil was ineffective at slowing the increase in fluazinam insensitivity when used as the only mixture partner with fluazinam.
- Avoid repeated application of the same product or mode of action and never exceed the label recommendation
- Multisite fungicides, e.g. mancozeb, should be used where possible throughout the fungicide programme
- The reliance on zoospore-active fungicides to control tuber blight can be reduced by: boosting foliar blight control during stable canopy; the inclusion of fungicides with good anti-sporulant activity; ensuring the haulm is protected until dead; preventing regrowth of haulm and by taking account of varietal resistance to tuber blight when deciding how soon to harvest after desiccation
- Consider possible selection pressure on *P. infestans* from the use of fluazinam soil treatments