

# Information Note: Scotland Cereals

## Control of Cereal Diseases Post Chlorothalonil

Wheat and barley disease programmes have relied on the use of multisite fungicides to both control disease and also protect single site fungicides in a programme.

One of the most effective multisites was the organic compound Chlorothalonil. This compound was first discovered and registered in the 1960's. Its use increased steadily over the years and over 300,000ha were treated with Chlorothalonil in the UK in 2016. However, following concerns about its environmental impact, the European Food Safety Authority revoked its authorisation and introduced a final use up date for its use of May 20th, 2020.



This has led to a re-evaluation of crop protection programmes in both wheat and barley. Other multisite products are still registered for use. In wheat, Folpet and Mancozeb are approved. In barley only Folpet is currently approved. The use of single site fungicides should be planned carefully to ensure maximum disease control without driving the development of fungicide resistance. A recent review of scientific literature indicated that the best way to safeguard these fungicides was to alternate the sprays or reduce the number of sprays and add a partner to a mixture. Ideally, a mixture should contain partner chemicals with similar efficacy against the target pathogen.

## Wheat Disease Control

Wheat fungicide programmes to control Septoria used chlorothalonil to protect azole and SDHI products. The mixture products used in these trials all showed good activity and are intrinsically more active against Septoria than chlorothalonil (Bravo). The straight azole and SDHI products were out performed by the mixture. See Figure 1 which shows protectant activity from fungicide products in 2019 (AHDB Fungicide Performance trials).

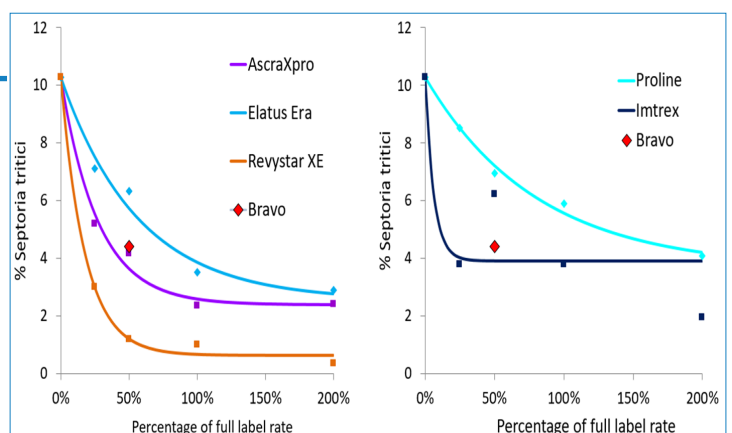


Figure 1. Fungicide activity against Septoria Tritici

Chlorothalonil was seen as an inexpensive option at early fungicide timings. However, fungicide application should be based on risk of disease development. Monitoring of disease levels in crops should be carried out by regular crop walking. The ultimate aim of wheat disease control is to protect the upper leaves in the canopy which produce the carbohydrate that fills the grain. It is important to try and control disease levels in the crop as the stem extends in spring (HS 31- T1) and also once all of the leaves have unfurled (GS 39- T2). The new Revystar® XE product is currently the most effective mixture product on the market. Although this is a mixture of SDHI/azole, the partners are not equally active against Septoria.

*(article continued on next page)*

# Control of Wheat disease (continued)

## Available alternatives to Chlorothalonil

Therefore, a multisite might be considered at the T2 timings.



Figure 2 Disease in untreated wheat crop, 30 July 2019



Figure 3. Disease control in wheat crop following RevystarXE applied at GS 32 and GS 39, July 2019

The introduction of a new fungicide with a novel mode of action (Qil group), Inatreq™ will offer more flexibility for T1 and T2 timings.

Control of rusts and mildew diseases was not a major strength of Chlorothalonil so the SDHI/azole mixtures remain the best options to control brown and yellow rust in wheat and also powdery mildew.

Multisites have also been considered at T3 options in wheat, primarily to protect the ear from Fusarium head blight. Although, chlorothalonil was considered here the most effective multisite in this situation is Mancozeb.

## AHDB Fungicide Performance Trials

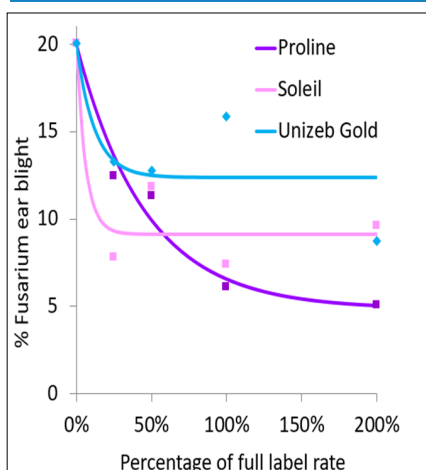


Figure 4. Control of Fusarium in inoculated trials, 2019.

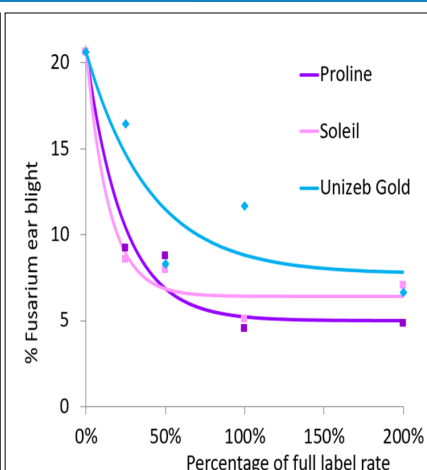


Figure 5. 2018/19. Mancozeb is Unizeb Gold.

Although the multisite showed good activity in 2018, in 2019 the reduction achieved by the multisite was not at the same level as the azole fungicides.

Watch a recording of our Spring 2020 webinar

[‘Scotland’s Cereals - A National Update on Cereals & IPM Principles’](#) available on our website.

## Wheat Disease Management

1. Use balanced mixtures if possible.
2. Limit dose and application number of actives where you can.
3. Tune doses and active to risk.
4. Target most effective products at most responsive timings.
5. Use new chemistry as an alternative to azoles.
6. Inatreq™ at T2 would be an option to alternate with SDHI at T1.
7. Folpet is the likely successor to chlorothalonil at T2 but consider mancozeb at T3.

# Control of Barley Disease Post Chlorothalonil

## Barley Disease Control

Barley disease management is focussed on preserving grain number and ensuring grain size is maximised. Tillers and healthy ears are protected by T1 (GS31) sprays. In winter barley this timing is important to control overwintered disease before stem extension. In spring barley this timing is less important and inputs can be reduced. T2 timings (GS49) are aimed at protecting upper leaves to allow grain filling to be completed. Later T3 sprays might be considered to control Fusarium head blight but in trials rarely increase yield.

The major disease threats in barley are Rhynchosporium leaf scald, Ramularia leaf spot, powdery mildew, net blotch and rusts. Disease levels should be monitored closely by regular crop walking.

Chlorothalonil was the most effective fungicide against Ramularia leaf spot and its loss presents a major challenge.

### Ramularia Leaf Spot

Ramularia leaf spot rarely appears in the barley crop before GS72, so control measures have to be applied prophylactically. T2 is the usual timing for this to be applied.

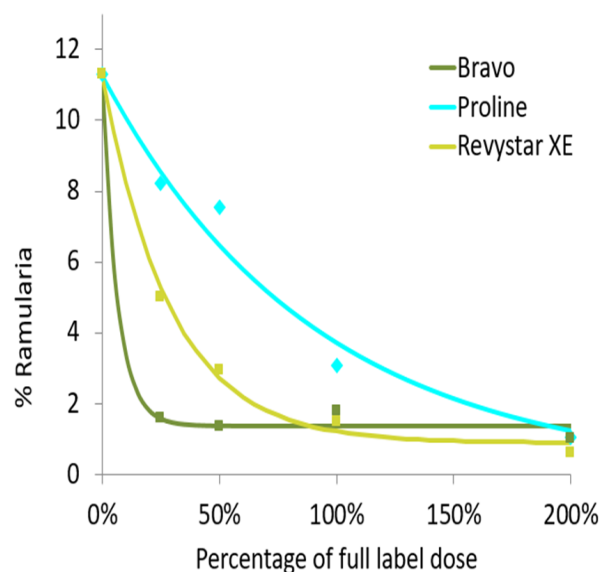


Figure 6 Control of RLS in barley crops (AHDB Fungicide Performance trial 2019)



Figure 5. Ramularia leaf spot in spring barley

The new azole in Revystar® XE gave good control of Ramularia in the trial plots. Although this was not at the level found in chlorothalonil it still offers barley growers an option to control Ramularia in their crops. However, its use in malting barley crops is restricted to pre GS45 only. Therefore, this should be taken into account if it is included in disease control programmes

For more information about cereal disease management visit our website at [www.fas.scot](http://www.fas.scot) where you can also read our regular Crop Health Updates

### Barley Disease Management Summary

1. Monitor disease levels in crops.
2. Limit dose and application number of actives where you can.
3. Target most effective products at most responsive timings.
4. If site and crop are considered high risk to Ramularia control can be achieved by Revystar® XE.
5. Proline also has residual activity against Ramularia.
6. Folpet may be considered at T2.
7. Avoiding crop stress will reduce disease severity.



# Pesticide Disposal

---

When a chemical or active has a given use-by-date it is empirical that you follow the governments stipulations. There may be a financial cost to this but if you choose to not take it seriously then consequently you risk paying far more in penalties. If you have chemical that has restriction imposed, you really have five options. Some options are more environmentally sustainable and are friendlier on the wallet than others!



1. **Use it in the manner it was intended.**
2. **Look at unconventional spray timings and changing your chemical control programme.**
3. **Have it taken away by a licensed waste disposal company.\***
4. **Inquire whether neighbours can use it in their crop protection plans.**
5. **Enquire whether supplier or local authority will take back any extra chemical and check there is no amnesty scheme for the chemical.**

*\*Make sure you get in touch quickly as things are changing with Covid-19*

## Revoked Chemicals

---

The consequences of possessing revoked chemical vary in their severity depending on who is the assessor, the quantity and type of chemical, and the reason for holding onto a banned substance.

If any revoked chemical is found whether that be: in containers, disposed of illegally, in spray records, then you would be potentially liable for prosecution from the Health & Safety Executive. Another pain point would be the Farm Assurance accreditation. This would be in jeopardy if found to be non-conformed. There might be no warning if this is a repeat offence or if a revoked chemical is found to have been used on a crop or dumped.

A further loss to the business would be a RPID penalty. This would start at a minimum 5% financial penalty on all schemes grants from RPID if inspected and found in breach.

Disposal of revoked chemicals can be some of the most awkward things to remove. The government recommend taking the following steps when disposing of chemical:

- **Calculate the stock volume and know the MSDS number of the chemical.**
- **Contact your local certified hazardous waste disposal company as quickly as possible to help dispose of this stock. Provide details including quantity and MSDS label.**
- **Contact SEPA for SWCN Code number. Pay fee. See link [www.coronavirus.sepa.org.uk/media/1042/covid19-waste-management-guidance.pdf](http://www.coronavirus.sepa.org.uk/media/1042/covid19-waste-management-guidance.pdf).**
- **Pay disposal officers fee. Ensure paperwork is sorted and you keep your copy safe. [www.wastedirectory.org.uk/](http://www.wastedirectory.org.uk/)**

What is essential is the paper chain. Missing records could be flagged up in any type of inspection and you could still be fined/prosecuted even if you have disposed chemical legally. Therefore, keeping easily referenced files with these receipts is good practice and one thing less to think about!

---

*Contributors: Neil Havis (SRUC Senior Plant Pathologist) & Jack Munro (SAC Agricultural Consultant)*

*This Information Note was funded by the Scottish Government as part of its Farm Advisory Service.*