

## In this issue

# Fungicide performance in wheat disease control

Stuart Hill, technical and development manager, has reviewed Frontier's fungicide trials programme results to date and considered yields from growers' farms. It is clear that we have reached a cross roads for disease control in wheat.

Yellow rust is now an annual issue and last season saw more pre-Christmas and pre-GS30 applications than ever before. This is due to a combination of climate, new yellow rust races and weakness in wheat variety resistance; half of the varieties on the HGCA Recommended List score 6 or less for resistance, with some key varieties in Group 4 susceptible, such as KWS Kielder, KWS Santiago, Conqueror, Duxford and Grafton. More importantly, the new Warrior rust race is more aggressive and adaptable to extreme conditions than other races because of its greater genetic diversity.



The Warrior race has dominated the results from samples tested this spring by the UK Cereal Pathogen Virulence Survey (UKCPVS). That follows on from 2013 when 83% of tests showed that Warrior race was present. This autumn, 50% of the area drilled is likely to be planted with varieties with scores of 8 or 9 to adult plant resistance, but this does not mean we can relax. Because the Warrior race dominates and is diverse, within one season a variety can break down. Additionally, seedling resistance can be different to adult resistance and yellow rust may need treatment over winter before adult plant resistance kicks in.

Because this new aggressive race can recycle quicker than others, the main challenge is in the monitoring, but we do have the chemistry to deal with it. Products containing epoxiconazole, tebuconazole or cyproconazole will still control rust, but timing is critical to keep on top of the disease. This may mean applications in the autumn or early spring prior to traditional T0, GS 30 timings. SDHI chemistry and pyraclostrobin also give good activity in the main part of the season. We have good diversity of chemistry that controls yellow rust; the key is to not let it take hold in your crops.

## Septoria tritici

As far as Septoria tritici is concerned, we are in an era of management as opposed to control. With wheat prices down to around £110/ton and growers seeing fungicide programme costs increasing, it unsurprisingly raises some questions heading into next spring. From both our trials and growers' results it is clear that in terms of margin over input costs, our robust programmes this spring have paid off significantly in a challenging disease year.

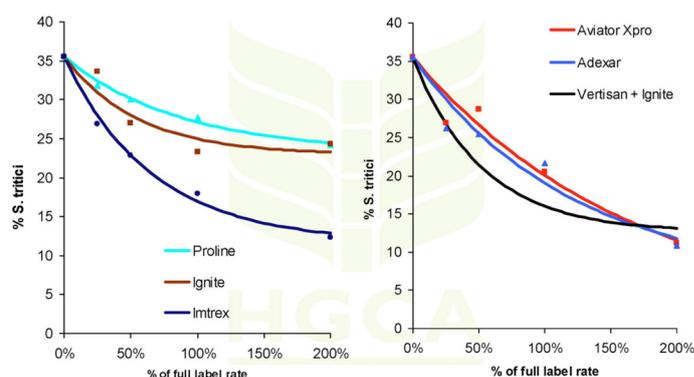
In the 1990s and 2000s we were blessed to have significant chemistry introductions. Epoxiconazole (Opus) was introduced in the 90s, and Strobilurins (azoxystrobin) followed. Prothioconazole (Prosaro, Proline) emerged in the early 2000s and then came the new generation SDHIs; bixafen (Skyway, Aviator), fluxapyroxad (Cerix, Adexar) and penthiopyrad (Vertisan). Unfortunately in the meantime Septoria tritici has adapted very well to our extremes of climate, lack of varietal resistance and, importantly, to the new chemistry.

Epoxiconazole and prothioconazole have remained the foundation of programmes for over a decade and during this time septoria populations have become less sensitive to them. As a consequence, product eradicant activity has declined markedly.



HGCA annual dose response data has further confirmed the loss of efficacy of our core triazoles in 2013, the last recorded year (Graphs 1 and 2).

Graph 1 and 2: HGCA product dose response 2013, eradicant activity



Proline: prothioconazole  
Ignite: epoxiconazole  
Imtrex: fluxapyroxad

AviatorXpro: bixafen + prothioconazole  
Vertisan: penthiopyrad

Adexar: epoxiconazole + fluxapyroxad

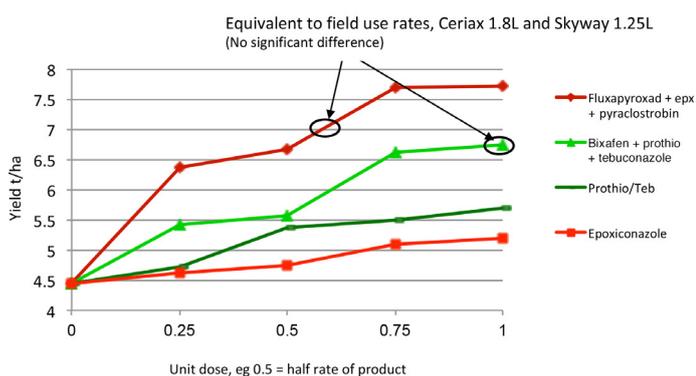
# Fungicide performance in wheat disease control (Cont.)

To support this work, Frontier carried out fully replicated dose response trials in 2014, the results of which can be seen in graph 3 below. A single application of each product was applied in an eradicant situation at GS 39, flag leaf timing. The wheat variety was Conqueror, a hard group 4 with a resistance rating of 5 – typical in this group. On 29<sup>th</sup> June septoria levels on the flag leaf were 100% in the untreated plots.

The data clearly demonstrates the yield performance achieved by using robust, multiple mode of action mixes. All of the components play their part, but the key message is to ensure a protective position from the outset.

Graph 3: Frontier trial 2014: product dose response

Fully replicated trial, products applied once at T2 timing only in eradicant situation. No previous applications were made.



The need for a protectant approach is further emphasised by HGCA data, which confirms that the efficacy of epoxiconazole and prothioconazole at full label rates has dropped by around 70% in an eradicant situation. This supports the use of several modes of action in mixes, to maintain early protection.

## SDHI chemistry at T1

The benefits of SDHI mixes at T2 are clear, targeting the flag leaf which provides the greatest response in terms of yield. In 2013/14, Frontier trials showed that the minimum benefit of an SDHI formulation compared to the best triazole mixture in the eradicant situation at T2, provided a margin over input of £90/ha (based on a wheat price of £110/ton).

There has also been much discussion about use of SDHI at T1. The flag leaf is still a key element for yield building, but we can no longer afford a situation where disease proliferates rapidly up the plant due to poor chemistry choice or timing at GS32, requiring a reactive eradicant approach at GS39. If the pressure is on from the beginning, we must use our best mixture and formulation chemistry from leaf 3 onwards.

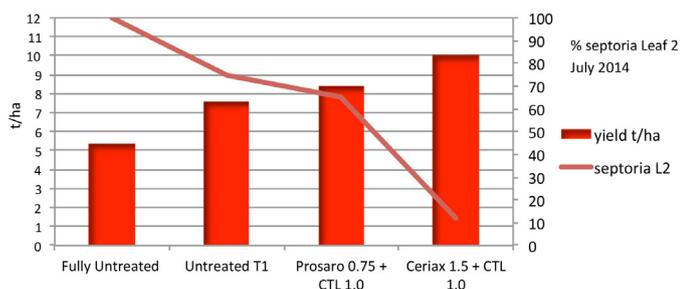


Work carried out at our 3D Thinking trial site at Haywold in Yorkshire, confirmed that in high pressure situations, using multiple mode of action formulations, including SDHI chemistry at T1 as well as at T2, resulted in a 1.63t/ha increase in yield. This gives a margin over input of £164/ha.



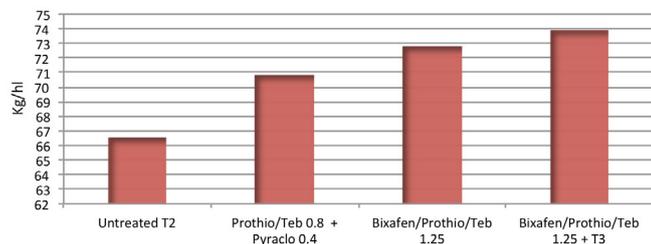
Graph 4: Yield response (t/ha) and septoria % following T1 fungicides: Haywold, Yorks 2014, early drilled Solstice

CV: 2.85 %, LSD: 0.446 t/ha , T2 Skyway 1.25L, T3 Prosaros 0.8L



The advantage of SDHI chemistry with regards to specific weight was also clear at our Haywold site. As shown in graph 5, at T2 the SDHI gave an extra 2kg/hl over the triazole T2 programme. The addition of T3 added an extra 1kg/hl on top of this.

Graph 5: specific weight advantage from SDHI programmes



“It is vital to maintain early protection. Multiple modes of action are an essential part of an effective anti-resistance fungicide programme”

**Stuart Hill**

Technical and development manager



### Conclusions

We can draw a number of clear conclusions from our own and external data. Some of the key points include:

- Timing is critical; too early and key leaves may be unprotected, too late and infection may already have occurred
- Rust: even with high varietal resistance ratings, vigilance is still needed with the aggressive Warrior race of yellow rust. SDHI, certain strobos and triazoles show good activity
- Septoria varietal resistance ratings are indicative only, robust and timely programmes will still be needed
- SDHI chemistry has now been raised from medium to medium/high resistance risk by FRAC (Fungicide Resistance Action Committee) for Septoria tritici. Multiple mode of action mixes are required
- Data from 2014 indicates strongly that triazoles in eradicant situations will not provide sufficient activity against Septoria tritici
- Protectant chemistry (chlorothalonil, folpet) should be used through the programme
- Triazole, SDHI and protectant chemistry need to be used together in robust programmes for sustainable Septoria tritici management
- T0 GS30 applications should be a standard part of Septoria tritici programmes. In rust situations, strobilurin rust active products may be used to avoid over reliance on triazoles
- T1 GS32 Septoria tritici applications should consist of SDHI, triazole and protectant modes of action. Triazoles need more protection having historically been used at least 4 times in programmes
- T2 GS37-39 applications will also require SDHI, triazole and protectant modes of action
- T3 GS59-61 early flower applications, should be utilised to manage Septoria tritici foliar disease as well as fusarium ear disease.

# OSR top dressing; plan now for spring 2015

**At this stage in the development of the oilseed rape crop, it is far too early to know how advanced the crop will be in early spring. However, there are a number of key factors to consider when preparing your fertiliser plan for early 2015 says Mike Slater, fertiliser technical development manager.**

Oilseed rape demands large amounts of nitrogen, potash and sulphur and it is important to consider early on where these nutrients will come from; some will be retained in the soil and some will need to be supplied in fertilisers. With large cereal yields this year, the amount of phosphate and potash removed will be greater than usual. A 10t/ha wheat crop with straw baled, for example, will remove 84kg of phosphate and 104kg of potash. On low nutrient status soils this could have a seriously detrimental effect on the following rape crop if not replenished.



To support a 4t/ha rape yield, around 260kg of nitrogen, 300+kg of potash and 200kg of sulphur as  $\text{SO}_3$  will need to be taken up by the plant. Much of the potash returns to the soil as the crop ripens but peak demand must be met to support high yields.

A potash index of 2 or 2+ should be able to supply most of this crop demand. Where additional potash is required, it can be applied in late autumn or with nitrogen and sulphur in the spring, to avoid an extra pass through the crop. Adequate potash is vital to control the water balance in the plant, along with the translocation of carbohydrates from the leaves to the pods.

To build the ideal crop canopy (GAI 3.5), around 175kg/ha of nitrogen will need to be taken up by the crop. Once this canopy has been reached, additional nitrogen uptake is required to keep the upper leaves and pods well supplied to achieve optimum photosynthesis. The upper leaves need to be at around 5% N and should be checked at the end of petal fall; if nitrogen levels are below target, late foliar nitrogen should be used. Total nitrogen requirements vary little; however, early applications will be dependent on crop development by early spring. Where soil nitrogen levels are low, 220kg or more of fertiliser nitrogen will be needed.



As less atmospheric deposition is causing background sulphur levels to decline, fertiliser sulphur requirement is steadily increasing; the only other sulphur sources are organic matter and manures. To achieve good yields, oilseed rape has a high demand for sulphur to support protein synthesis in the seed.

A top dressing schedule should be based on three applications and foliar nitrogen at petal fall if required. The first application should be straight nitrogen. In advanced crops, a reduced amount can be used, saving the remainder for later in the season. The two main dressings should then comprise either N & S or N, K & S. Total crop guidelines, dependent on location, would be 220 to 250kg N, plus 100 to 120kg  $\text{SO}_3$  (two thirds of total requirement) and at least 50kg of potash if none was applied in the autumn.



“After large cereal yields this year, low nutrient status soils could have a seriously detrimental effect on the following rape crop if these elements are not replenished.”

**Mike Slater**

Fertiliser technical development manager



**Key features include:**

- Automatic transfer of data from the field to the grower's data management system, eliminating the need to manually write and transfer notes
- A clear, intuitive layout on a large screen, making it easier to use in the cab
- The ability to drop markers to record points of interest, such as weed populations or crop variation
- Being able to use the app on their existing iPad, thus keeping costs to a minimum
- Touch screen interaction.

**iSOYL, the first variable rate application system to run on an iPad will streamline the precision crop production process for growers, saving time, money and effort. Simon Parrington, commercial director for SOYL explains how the system works and how it will benefit farm businesses.**

As an increasing number of farms use precision farming techniques, feedback from SOYL customers has confirmed that clarity and ease of use are two of the most desirable features in the systems they use.



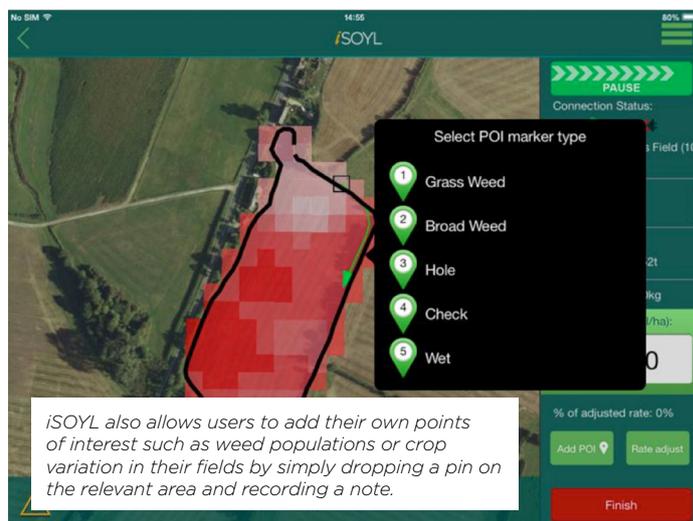
iSOYL has been designed with a clear, uncluttered layout, to let you access all of your precision farming data in one place. The touch-screen allows the user to quickly find, control and edit files making iSOYL much more practical to use than current systems. It can be used for all variable rate methods including P&K and nitrogen application, and variable rate seed. In the cab, the large, full colour display makes application maps clear and there are no small, fiddly buttons to press; that can make a real difference if you are amending your application files on the move or dropping markers to record a point of interest.

iSOYL is compatible with all popular spreader, sprayer and drill controllers. It uses a smart cable to connect to the control boxes, and a data transfer system allows information to be wirelessly transferred between field and office.

Another key feature of iSOYL is that it can automatically write back your precision farming data from the field straight into your crop recording systems, eliminating the need to manually write notes, and reducing the amount of time spent on office admin.

RBI which manages the GateKeeper farm records system is developing a link to allow as-applied records from iSOYL to be easily imported. Ben Hatton, national account manager for RBI says "The ability to incorporate precision farming data alongside the day-to-day crop records in GateKeeper is vital to our users.

Accessible and accurate data is key for decision support and business management. The link with iSOYL continues our business approach for integration with the industry's leading providers of agronomic advice, services and machinery."



iSOYL is compatible with iPad, iPad Mini and iPad Air which can help to keep the initial outlay to a minimum for existing iPad users. Additionally the look, feel and methods of interaction will already be familiar to anyone that is used to working on an iPad, making iSOYL even easier to use.

**Using iSOYL will cost £495. The one-off price includes a licence for MySOYLSync, and supply of the smart cable and adaptors. The app itself is free to download from the Apple App Store. To find out more visit [www.isoyl.com](http://www.isoyl.com)**

"We are always looking for ways to make precision crop production as simple as possible. This is the next generation of precision technology and will enable more growers to use variable rate techniques on their farms."

**Simon Parrington**  
Commercial director, SOYL





# Can beans bring benefits to your business?

**The area of spring pulses grown in 2015 is likely to increase as growers turn to beans and peas to meet the new CAP greening requirements, manage black-grass and mitigate falling oilseed rape prices. Frontier pulse manager, Andy Bury, considers market options.**

Recently, the area of pulses grown in the UK has fallen from its traditional level. This season, as growers look to meet the 5% EFA requirement in CAP greening, we are likely to see the area increase by up to 30%. Some commentators believe that increased acreage will put downward pressure on prices, but that should not be a concern. Prices will be slightly lower, but there will still be a substantial premium over wheat. The significant advantage is that this will bring more buyers into the market and increasing demand will create opportunities.

## Growing markets

Demand from UK compound mills for ruminant and pig rations is likely to return, as is demand in southern Spain and Italy. As feed bean prices get closer to wheat values, demand from the aquaculture sector is increasing; salmon farming in Scotland and Norway requires a substantial supply of de-hulled beans. Frontier currently supplies around 30,000t a year to the Scottish industry, and this is set to increase as the salmon market grows between 3-6% a year in UK waters.

Frontier is the largest exporter of pulses for human consumption, and that too is a growing market. Market growth in North Africa, where pulses are a staple food, is fuelled by population increases of around 2% a year. Current consumption is between 12-1400t a day, predominately in Cairo.

The UK, France and Australia are the only three countries that grow beans for human consumption in Egypt. A combination of spraying restrictions and quality issues in France in the last two years means that its acreage is likely to reduce, again offering opportunities for UK growers. UK spring beans have always been

seen as a premium product over French, consumed as baked beans or 'ful mesdame'. French beans are generally de-hulled and used in falafal.

## Variety choice for peas and beans

Growers should always begin by considering the end market; variety choice is paramount. Ideally aim to grow for human consumption as there is a marked price difference between that and feed. Two new bean varieties have recently been introduced, offering increased yields and a large seed size ideal for the export market.

For peas, 2015 market values will be at least £300/t for marrowfats, against £160/t for feed peas. Large blues are likely to be plentiful, so expect values around £200/t. If you are considering peas, ensure that the seed supply is secured as only a limited amount is available for planting in spring 2015.

Frontier's current feed bean contracts offer a premium of around £30-35/t over Nov wheat futures. Additionally there will be premiums, dependent on quality, where beans reach the specification for human consumption



## Quality questions

To achieve the best market value, beans need a good appearance; moisture content and admixture are factors, but the main quality decisions are based on the look the beans. They should be clean and bright with a slight greenish hue, not stained or wrinkled. Larger beans of uniform size are preferred.

Beans with visual impairments will achieve a lower price and bruchid holes are a particular problem. Care should be taken to avoid broken and damaged beans; setting up the combine correctly will help, as will care during the drying process.



**"The key to quality is attention to detail. Those who invest time and effort see results in yield and quality. Given the large price differentials it is worth doing well."**

**Andy Bury**  
Frontier pulse manager



With the maize harvest well underway, agronomist Matthew Taylor considers some of the challenges and cropping opportunities that exist post-maize. With potentially late harvests, choice of following crop is crucial to ensure good autumn establishment.

### Challenges

Maize is an extremely susceptible host for fusarium species. Ploughing should be the primary cultivation technique; fusarium develops on post-harvest crop residues, so the burial of these will reduce build up. Where ploughing is not possible, three or four deep cultivations will also reduce the risk. Single pass techniques should be avoided after maize. Additionally, cultivating to an adequate depth will help relieve compaction, potentially caused by harvesting in autumn.

### Options

Rye: On livestock farms, hybrid rye offers high yields of wholecrop silage and, if there is anaerobic digester (AD) demand, can offer high yields of feedstock. Growers can target 45t/ha fresh yields. Modern hybrids, like Magnifico or Mephisto, can out yield wholecrop triticale by 15-20% and wheat by 40%. The vigour of hybrid rye makes it well able to handle the difficult field conditions that can occur after maize.

Rye's attractions for AD include high yields of feedstock and a crop that can be established and grown using common cereal machinery and agronomy. This year, Frontier's trials showed a range of yields from different varieties; it was also clear that high levels of nitrogen will increase yields.



### Cover crops

Cover crops are very useful, both before and after maize. They can:

- Prevent nitrogen loss from bare soil over the winter
- Feed captured N into the maize crop, allowing N application reductions
- 'Mop up' the nitrogen in digestate or manures
- Help with soil structure and health
- Prevent erosion and soil run off.

A range of cover crop species can be used depending on whether they go in before or after maize.

After maize, straight crops or mixtures of mustard, forage rye, Westerwolds ryegrass and turnip rape are useful. Before maize and after a cereal, forage rye, vetch and oil radish are good choices.

### Wheat

Wheat varieties grown after maize should yield well when late sown and have a high fusarium resistance. Suitable varieties include Leeds, Conqueror, Revelation and Belepi. With a 7, the highest possible score for fusarium resistance, Belepi is likely to be one of the best choices. It is a winter wheat with very low vernalisation requirements and has the widest drilling window of October to March, with high yields when drilled in October or November.

### Anaerobic digestion

Many AD plants are moving to a two or three crop intake policy. This is advantageous as it splits both workload and risk. The UK is at the northern limit for maize production, and although we have seen big crops this year, the weather in the spring can severely limit the yields. To alleviate this, winter rye and energy beet can offer consistent yields. Frontier provides agronomy for beet crops for AD, including energy beet, fodder beet and sugar beet. There is evidence from Germany that AD plants perform more efficiently with a mix of input stocks.

With all the above options Frontier's experts can advise you on the best decisions for your particular circumstances.



# Fallow for farmland birds

**From 2015, farmers will be required to commit 5% of their land to an Ecological Focus Area (EFA) under CAP reform. This can be achieved by implementing a combination of buffer strips, land lying fallow, catch crops or green cover, nitrogen-fixing crops and hedges. While final details are yet to be set, the fallow option is confirmed and if used wisely, could bring huge benefits for a range of farmland birds, including grey partridges says Meehal Grint, Kings technical advisor.**

While the term 'fallow' may be understood to mean land left bare or unsown, this is not the case for EFAs; though the land cannot be used to make a financial profit during the given period, it can still be used to serve a purpose, and growing of some specific crops is permitted.

The fallow option offers farmers and game managers an excellent opportunity to create additional habitat and cover. Where growers have already established wild bird seed mixtures and pollen and nectar plots under Campaign for the Farmed Environment, these can be transferred to the EFA.

## Nesting cover

Existing grass margins and field corners will provide excellent nesting areas for grey partridges and can be counted towards the EFA. For new establishments, consider basic wildflowers which provide additional ecological benefits, especially for pollinating insects, creating insect rich cover for brood rearing.

## Brood rearing

One of the simpler options is to establish an autumn sown wild bird seed mix or dedicated brood rearing mix after harvest, when weed pressure is reduced and moisture availability is good. This provides cover from January to May, when birds are most vulnerable to avian predation and is a vital source of insect food. Establishment is relatively simple, taking place at the same time as autumn cereal crops. The plot can be moved around the farm each year as part of the rotation, as it will be in situ from 1<sup>st</sup> January to 30<sup>th</sup> June.

## Winter food

A well established wild bird seed mixture will provide a source of food for game and farmland birds through the winter months. These can be established in April/May as annual or biennial mixes which provide both cover and feed. If correctly implemented, wild bird seed mixtures grown on fallow land under EFA can be used to create large holding areas, linking strips and simply to complement existing driving cover.

## Pollen and nectar

Pollen and nectar is a good longer term option, providing an excellent nectar source for pollinating insects. The legumes in the mixture will boost soil fertility and soil health ready for when the plot is brought back into the rotation. Careful establishment and mixture selection is critical and expert advice should be sought.

### EFA fallow criteria:

- Minimum size: 2m wide and 0.01ha area
- EFA must be 5% of total arable land
- Can be permanent or rotational
- Must be present 1st Jan – 30th June with no crop to be established in this period other than wild bird seed mix or pollen and nectar
- Can include buffer strips and existing field corners.

“Choosing the fallow option and leaving land unworked may seem an easy way to meet requirements, but doing so is a wasted opportunity and growers are encouraged to make full use of this option to benefit both birds and business.”

**Meehal Grint**  
Kings technical advisor

