



**COST-EFFECTIVE  
FUNGICIDE PLANNING  
FOR INDIVIDUAL  
FIELD, VARIETY AND  
WEATHER RISKS**





# PLANNING YOUR STRATEGY – A HELPING HAND

**PRODUCING GOOD WINTER WHEAT YIELDS IS ESSENTIAL WITH VOLATILE GRAIN PRICES.**

**BUT HOW DO YOU DECIDE WHICH FIELDS TO PRIORITISE FOR ROBUST FUNGICIDE PROTECTION, AND WHICH FIELDS MIGHT JUSTIFY A LOWER INPUT APPROACH?**

**INTRODUCING ADAPTIVE DISEASE MANAGEMENT**

**Adaptive Disease Management (ADM)** is a new initiative being developed by Syngenta, which aims to provide a simple, structured framework to help you make these decisions with greater confidence.

Drawing on our combined experience of how varieties behave (as a plant breeder) and how fungicides interact (as a research-based crop protection business), it is based on the principle of using 'known' disease risk factors

to plan a 'base' fungicide programme at the start of the season, before deciding whether to adapt this to 'evolving' disease risk factors as the season unfolds.

As well as this printed guide, we have further material available online and will be further road-testing the approach 'live' at our Innovation Centres this season (see back page). So there are plenty of opportunities to find out more and get involved.

## HOW ADAPTIVE DISEASE MANAGEMENT WORKS

### IDENTIFY YOUR 'KNOWN' DISEASE RISK FACTORS (once crop drilled)



DRILLING  
DATE



VARIETY



LOCATION

USE THESE TO PLAN A 'BASE' PREVENTATIVE FUNGICIDE PROGRAMME FOR EACH FIELD SITUATION

### ASSESS 'EVOLVING' RISK FACTORS (in-season)



WINTER  
WEATHER



SPRING  
WEATHER



WEATHER  
FORECAST

USE THESE TO IDENTIFY POSSIBLE ADAPTATIONS OF THE 'BASE' PROGRAMME (IF NEEDED), ACCORDING TO YOUR ATTITUDE TO RISK



# THE CORE APPROACH



*“Challenges of eradicating *Septoria tritici* with triazoles nowadays, plus threats from rust, mean staying on the front foot against disease is essential. We don’t know future disease pressure at the time of spraying.”*

IAIN HAMILTON  
Syngenta Field Technical Manager  
Over 30 years’ experience of designing fungicide programmes

## MAINTAINING FUNGICIDE PERFORMANCE

Latest SDHI fungicides are performing well now, but it is important the industry works together to maintain anti-resistance strategies. This will help to ensure we do not lose the efficacy from this important chemistry.

As well as practices such as adhering to maximum numbers of fungicide applications per season, it is thought that controlling infection early, before levels have increased, as well as using fungicide mixtures, helps to reduce resistance risk.



## 1 TOUGHER DISEASE PROBLEMS

With its reduced sensitivity to triazole fungicides, successfully ‘curing’ *Septoria tritici* can no longer be relied on. Similarly, the appearance of new yellow rust races has made this disease more unpredictable.

## 2 SYMPTOMS SUDDENLY ESCALATING

Disease can be quietly gaining a foothold (and crops sustaining losses from fighting infection) even before symptoms become visible – only to then rapidly escalate in suitable weather.

## 3 FUNGICIDES WORK BETTER PREVENTATIVELY

Fungicides, in general, give better results if applied ahead of infection – rather than after disease has built up.

AT THE CORE OF THE BASE FUNGICIDE PROGRAMME IS TO PLAN A STRATEGY THAT TARGETS DISEASE PREVENTATIVELY. THIS AIMS TO MINIMISE THE RISK OF YIELD POTENTIAL (AND THEREFORE INCOME POTENTIAL) GOING TO WASTE, AND IT’S FOR THREE COMPELLING REASONS

In addition, roughly three quarters of wheat yield comes from the top three leaves, and experience over recent seasons where early-season fungicides have been cut back, due to low initial disease pressure, has underlined the difficulty of regaining later-season control.

## LOCATION

FARM LOCATION IS A BIG FACTOR WHEN PLANNING FOLIAR FUNGICIDE STRATEGIES, BECAUSE IT HAS A MAJOR INFLUENCE ON THE PREVAILING WEATHER.

This, in turn, influences the main disease threats, because different diseases have their 'preferred' weather conditions – which, in turn, influences the types of fungicide chemistry to include.

# ADAPTING DISEASE MANAGEMENT TO 'KNOWN' RISK FACTORS



## SEPTORIA TRITICI

- The UK's number one wheat disease
- All varieties can get this disease, but there are a wide range of susceptibilities.
- Spores spread by rainsplash. Although a particular problem in the 'wetter West', cannot be ruled out anywhere, given the UK's climate.
- Warmer conditions cause more rapid disease cycling.

**TYPICAL YIELD LOSSES OF UP TO 20%, BUT CAN BE MORE IN THE WEST.**

Fungicide examples: SDHIs, chlorothalonil, (triazoles – reduced curativity).



## YELLOW RUST

- A growing problem in recent seasons with new "races" affecting previously resistant varieties.
- A prolific spore producer (1,000-2,000 spores/pustule/day). Spores airborne and can carry for miles.
- Humidity (mists/dews) encourages infection, with epidemics 'exploding' rapidly in suitable conditions (life cycle can be as short as 7-10 days).

**YIELD LOSSES OF UP TO 50%.**

Fungicide examples: triazoles, strobilurins, SDHIs.



## BROWN RUST

- Many varieties are susceptible to brown rust and resistance ratings vary.
- Another prolific spore producer. Like yellow rust, produces airborne spores (life cycle as short as 7-10 days), with humidity (mists/dews) encouraging infection.
- Prefers warmer, drier conditions than yellow rust, hence its more southerly distribution.

**YIELD LOSSES OF UP TO 40%.**

Fungicide examples: triazoles, strobilurins, SDHIs.

## POWDERY MILDEW

Powdery mildew occurs across the whole country and in some 'hot spots' and should be tackled with specific mildewicides.

Fungicide examples: morpholines, metrafenone, proquinazid.

SOURCE: AHDB

## ELATUS™ ERA

Providing new-generation protection against *Septoria tritici* and yellow and brown rusts, ELATUS™ ERA offers a strong foundation to fungicide programmes, wherever you farm in the UK.

Combining the new SDHI fungicide SOLATENOL™ – the result of a research project spanning more than 15 years – with the triazole prothioconazole, ELATUS™ ERA has been shown to deliver powerful disease control, consistent performance and complete leaf protection.

READ MORE ABOUT ELATUS™ ERA »



# VARIETY

AS WELL AS LOCATION, THE SUSCEPTIBILITY OF THE VARIETY PLANTED IS A MAJOR FACTOR INFLUENCING DISEASE RISK.

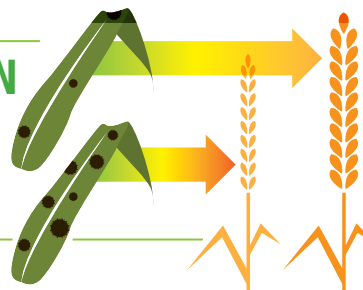
There are now big differences between varieties in their resistance ratings to *Septoria tritici*, yellow rust and brown rust on the AHDB Recommended List, and results from extensive trials at our Innovation Centres across the UK confirm a strong correlation between untreated disease levels and the yield response from fungicide treatment.



Accordingly, Adaptive Disease Management divides varieties into groups and directs greatest fungicide use to those where the disease risks are greater and where the fungicide yield responses are higher.

Rust, for example, is a very variety- driven disease, so it is considered important that rust-active fungicides are included on susceptible varieties at all timings.

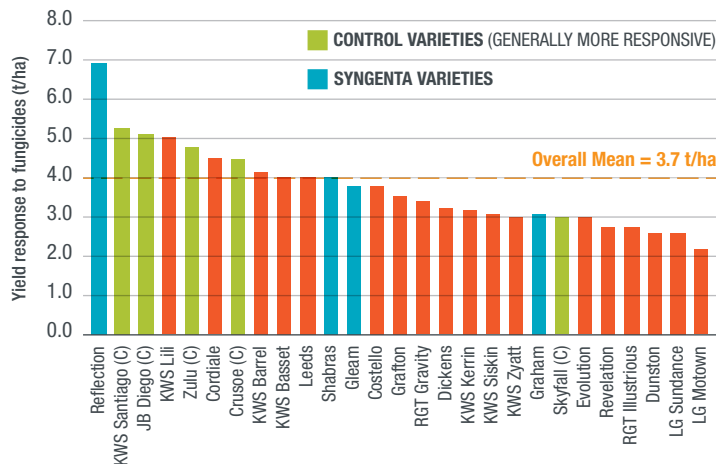
## STRONG CORRELATION BETWEEN REDUCING DISEASE AND INCREASED YIELD



## VARIETY MAKES A BIG DIFFERENCE:

YIELD Response RANK across top 25 varieties\* 2017 (RANGE 2.2 to 6.9 t/ha)

SOURCE: AHDB RL trials (6) where TREATED and UNTREATED screens are run. Full fungicide programmes \* Based on Provisional Certified seed sales autumn 2017



## LOWER RISK VARIETIES

Newer winter wheat varieties, such as Graham, offering improved resistance to *Septoria tritici*, can be an effective risk management tool.

By choosing one of these varieties you can benefit from flexibility in fungicide timings and potentially product choice and rates, dependent on other risk factors.

LEARN MORE ABOUT OUR VARIETIES AND THEIR DISEASE RATINGS »



# DRILLING DATE

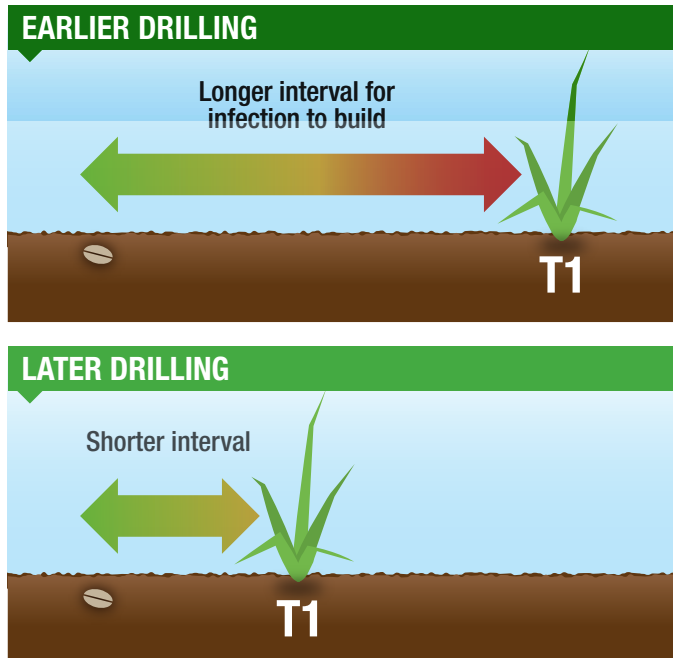
**DRILLING DATE AFFECTS DISEASE RISK BY DETERMINING THE LENGTH OF TIME AVAILABLE FOR DISEASE PRESSURE TO BUILD OVER WINTER.**

Earlier drilling allows more time for disease to go through more life cycles (from spore infection to spore production), with big differences in disease levels often observed between mid-September and mid-October drilled crops.

In addition, thicker crops, as a result of earlier drilling, can provide more suitable microclimates for infection later in the season, and allow easier disease spread because plants are more closely packed.

Second wheats can also be at risk from take-all, and may also need protecting against eyespot, especially if there is a history of the disease on the farm.

**EARLIER DRILLING ALLOWS MORE TIME FOR DISEASE TO INFECT AND FOR LEVELS TO BUILD**



## RUST RACES

The appearance of new races has made yellow rust outbreaks much less predictable nowadays, with a number of variety resistance ratings dropping and early infections of rust not uncommon over recent years.

With susceptible varieties, it is especially important to adopt good management practice – for example ensuring that fungicides used at all timings provide strong levels of rust control.



# WEATHER

ONCE THE INITIAL 'KNOWN' DISEASE RISK HAS BEEN DETERMINED, THREE PHASES OF WEATHER CAN INFLUENCE HOW DISEASE DEVELOPS.

## ADAPTING DISEASE MANAGEMENT TO 'EVOLVING' RISK FACTORS



**INFLUENCES THE SPEED OF OVER-WINTERED DISEASE DEVELOPMENT AND THEREFORE THE AMOUNT OF INOCULUM AVAILABLE COMING INTO SPRING.**

This should be evident when fields are walked in late winter or early spring, but remember there can be hidden infection. Milder, moist winters favour most diseases, and few varieties have seedling rust resistance, so this has the potential to establish early in crops.



**DRIVES HOW QUICKLY THE INOCULUM THAT HAS COME THROUGH THE WINTER THEN BUILDS.**

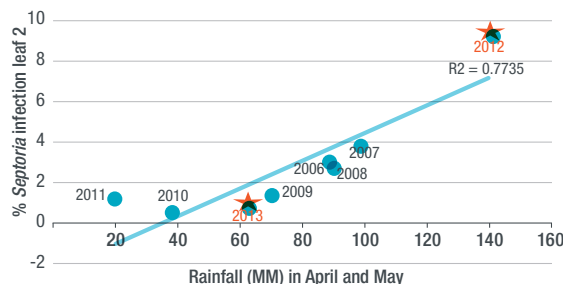
There is a strong correlation between *Septoria* levels and the amount of rainfall in April and May – around the time that T1 and T2 fungicides are applied. Higher temperatures also cause *Septoria* infections to cycle faster.



**THE BIGGEST 'UNKNOWN' FACTOR IN DISEASE DEVELOPMENT.**

How much you incorporate this into your fungicide decisions depends on your attitude to risk. Key considerations include the importance of preventing disease, rather than trying to cure it later, and the accuracy of the weather forecast. In addition, you don't know how much 'invisible' disease is already present.

**RAINFALL IN APRIL AND MAY DETERMINES *SEPTORIA TRITICI* LEVEL**



SOURCE: Crop Monitor

**FOR THE LATEST WEATHER FORECAST VISIT:**  
[www.syngenta.co.uk/weather](http://www.syngenta.co.uk/weather)

## FLAG LEAF PROTECTION

If *Septoria tritici* gets onto the flag leaf it is no longer possible to rely on curing it later with a triazole at the T3 timing.

As well as using SDHI protection at T2 to protect the flag leaf, remember the benefits of including BRAVO to provide an alternative mode of action – both for resistance management and extra *Septoria* performance.

**DISEASE CAN BE BUILDING UNSEEN INSIDE THE LEAF, WITH LITTLE EVIDENCE ON THE LEAF SURFACE.**



# PUTTING IT ALL TOGETHER

**IN 2018, WE WILL BE ROAD-TESTING THE ADAPTIVE DISEASE MANAGEMENT APPROACH FURTHER AT OUR INNOVATION CENTRES.**

Here, we'll compare programmes adapted to the season (which may be a higher risk approach) alongside 'base' programmes to see which delivers the best results. You can follow progress at our Innovation Centres throughout the season at

[www.syngenta.co.uk/innovation-centres](http://www.syngenta.co.uk/innovation-centres).

For more information on tailoring your fungicide programmes to your situation visit [www.syngenta.co.uk/adm](http://www.syngenta.co.uk/adm). You can use this guidance to help complete the table below for your own farm.

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## RESISTANCE MANAGEMENT CHECKLIST

### MIX

Always apply fungicides in mixture with other fungicides which have a different mode of action and good activity against the target disease(s) – e.g. triazoles are important to protect SDHIs (and vice-versa) and preventative applications of multi-site fungicide BRAVO will protect both triazoles and SDHIs.

### PROTECT

Aim to apply fungicides as protectants or as early as possible in the disease cycle to get the best levels of control – e.g. with *Septoria tritici*, don't rely on the limited curative activity of SDHIs to compensate for the decline in curative triazole control.

### CHECK

Always consult fungicide labels and never exceed the maximum number of permitted applications of any fungicide in a season. Similarly, do not use greatly reduced dose rate programmes, including repeat applications.

**FOR FURTHER INFORMATION,  
VISIT [WWW.FRAC.INFO](http://WWW.FRAC.INFO)**

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