Behind-the-scenes of RL trials

A new initiative to help explain how AHDB Recommended List trials are managed and some of the processes behind them is underway. *CPM* reports.

By Mike Abram

It's a well-oiled machine but behind the scenes there's a considerable amount of work involved in managing the process required to deliver each year's AHDB Recommended Lists (RL), which cover recommended, described and candidate varieties.

Nearly 25,000 individual trial plots are drilled, assessed and harvested each season to provide the annually updated variety data for 11 crops. But despite delivering independent variety information since 1944, the processes behind the RL remain somewhat a mystery to most levy payers.

Indeed, the most recent RL review from the beginning of 2023 saw around 75% of levy payers asking for more information about variety trials including how they operate and how recommendation decisions are made, explains AHDB RL manager, Paul Gosling.

That's led to a new initiative where using one specific trial in Terrington, Norfolk as a backdrop, AHDB is going behind the scenes to tell the story of how a RL trial is delivered and the procedures involved. This includes releasing blogs and videos from the site during the season to provide regular updates and information about its progress.

"We aim to give RL users greater confidence in the data and a better understanding of why we take certain approaches and decisions," says Paul.

The starting point of RL trials is a face-to-face meeting of the relevant RL Crop Committee in the summer before the season, he adds. Consisting of farmers, agronomists and representatives from key trade bodies such as breeders, millers, maltsters, and whisky producers, and independent technical experts, this is where breeders' data from the GB

RL review outcomes

During the recent review, around 75% of levy payers asked for more information about variety trials including how recommendation decisions are made, says AHDB's Paul Gosling.

In-person inspections
The role of AHDB's three field trials managers, including Mark Bollebakker, is to inspect trials to make sure they offer a fair comparison between varieties.

Trial protocols
With wheat RL fungicide-treated trials consisting of 50 varieties, trial design is crucial to maximise the chance of obtaining meaningful results.

and NI Variety Lists (VL) trials for a new variety are presented and debated.

"There are two years of breeders' trials for cereals before a variety can be submitted for recommendation. Our crop committees look at the data provided by the breeder and decide which should be selected to be a candidate."

A range of criteria is used to evaluate a variety including treated and untreated yields, agronomic characteristics especially disease resistance and standing power, and quality. "Those characteristics are weighted by importance and then assessed against established comparator varieties already on the RL," comments Paul.

Using that process, the committee then has a final vote – the breeder representatives typically abstain – to decide on which varieties to trial.

In this year's fungicide-treated trial at Terrington there are 35 recommended varieties plus 15 new candidates. The trial is one of 31 such winter wheat trials; this one being sown on 7 October following potatoes on a silt soil type.

Sites are found by various contractors employed by AHDB on five-year contracts to conduct the trials around the country, says Mark Bollebakker, AHDB senior field trials manager for the RL.

The programme tries to mirror commercial practice by location or rotational position – for example, mirroring the proportion of first and second wheats or split between spring and winter oats, and typical drilling dates.

With wheat RL fungicide-treated trials consisting of 50 varieties, trial design is crucial to maximise the chance of obtaining meaningful results, highlights Mark. "As standard, we use three replicates in most treated yield trials to reduce risk of field effects. That means in every replicate each variety is drilled once and randomised, so in a different order.

"But we also use an incomplete block within each replicate. So let's say one variety is in a small block in replicate one with four other varieties, then it'll be in another block in the next replicate with four other varieties," he says.

"If that block is in a higher or lower yielding area, then our analysts can make small adjustments to all the varieties in the block to make it more comparable. It makes the analysis more robust and less affected by trial area issues."

DISEASE CONTROL

Agronomic inputs for each trial are carefully managed via defined crop protocol, with the disease control programme typically eliciting most debate. For various reasons, the fungicide programme is much more costly and robust than what a typical grower would use.

"The aim is to keep individual diseases below 10%," Paul says. "It used to be 5%, but with the chemistry available that was unrealistic and meant we were rejecting perfectly good trials because of disease levels above 5%."

Given the level of disease control in trials with varieties with different disease strengths and weaknesses, taking account of regional effects on disease incidence with a single programme across all the trials necessitates a robust programme that's much more expensive than commercial programmes, he explains.

"It means in some locations, some of the fungicides applied won't be doing much – they're protecting against diseases that aren't found in that location or in some varieties. Putting a yellow rust-active fungicide on a variety with a resistance rating of nine won't give any yield benefit, but it has to be there to protect the varieties with lower ratings, which is why we end up with a very robust programme," stresses Paul.

Every fungicide used is commercially available and everything is applied at or close to full label rate with some discretion allowed within a specified range, he adds. "We also don't use anything that's in a use-up period, or likely to be in next 18 months."

The programme for the upcoming season in wheat has been tweaked to include the use of Syngenta's new fungicide pydiflumetofen in the flag leaf spray, with Corteva's fenpicoxamid switched to T1.

"We've struggled to control septoria during the past few years, particularly but not exclusively in the South West, so hopefully using new chemistry will help to improve our control," says Paul.

Around five or six RL sites are managed specifically to meet milling specification in wheat. "We also grow new varieties in a number of long quality strips at some other sites for UK Flour Millers to use. If they meet spec, they use those strips, but if they don't, they can use the RL samples to supplement the dataset," adds Mark.

Two different types of assessments are made within the RL trials with agronomic ▶

assessments such as disease levels, lodging, winter hardiness, straw length, date of ear emergence, maturity and sprouting, made by the contractor.

Then, the role of AHDB's three field trials managers, including Mark, is to inspect the trials to make sure they offer a fair comparison between varieties. "I give an overall assessment of the trial but also individually score each plot on a 1-4 scale. Four is a plot that looks great and I expect the data to be good; for a three I might have noticed a small gap in the plot, for example, but I think the data should be fine.

"A two is questionable – it could produce data but if I see anything odd in the stats I'll remove it from the final analysis; but if it's a one it'll automatically be excluded," explains Mark.

Typically, inspections are made from mid-June to mid-July in cereal crops, with oilseed rape earlier in the year from mid-March to mid-April at early to mid-stem extension.

Giving a sense of how these decisions and assessments are made, as well as what's happening at the trial in Norfolk, are some of Mark's aims for his blogs during the season. "I'm planning to publish every couple of weeks during the spring, particularly once we start seeing disease or other issues arise in the trial."

Yield remains one the key assessments of a variety but knowing when exactly to harvest a trial of varieties with different maturities is a challenge, highlights Mark. "One of the limitations of the RL is that it can be disadvantageous for anything at the edges. For example, an early maturing variety might be slightly past its best by the time the combine goes through, while waiting for the last variety is ready would affect the rest of the trial.

"It's important to get harvest timing right so crops don't sit ready in the field for too long, especially for quality aspects."

Once combined, data is sent into AHDB within 3-5 days of it being harvested; the time taken for results to be published is dependent on the validation of the data. "This can cause some delays, particularly for early harvested trials," admits Mark.

Using his visual inspection scores of each plot is an important part of that validation process, to help make sure the data makes sense. "Where there's doubt that a plot isn't representative of the variety then a decision can be made to remove a plot's result.

"That's the importance of replicates," he stresses. "And ultimately, while publishing the harvest results in a timely manner is useful for growers, we have to produce reliable data for a RL that in 2025 makes up the list for the 2026/27 season."

FINAL VALIDATION

Deciding which varieties make it onto that list is the last step of process, and it's back to the crop committees, adds Paul. "Once the trials have been validated, the data team analyses it statistically and for the candidates adds that to the two years of breeders' Variety List data to get a three-year data set."

What follows is essentially a repeat of the candidate selection process, where the committee examine the data, breeders make a case for their varieties, and then a committee vote decides on whether to add it to the RL, says Paul.

The criteria used to make that decision have evolved with a fundamental shift taking place last season to place more emphasis on disease resistance and untreated yield. "We also now have minimum standards for all diseases which are the same as used in the Variety List. They're quite low but in addition the RL uses target specifications, so where the minimum standard is three for yellow rust in wheat, the target specification is six," he explains.

"We wouldn't expect a variety to be recommended if it was below six, unless it has a good reason to be recommended. Those target specifications have trickled into the system during the past few years, but last year we introduced them across all crops for all diseases at different levels depending on how important the committee felt they were and how difficult or easy to control.

"We also have target specifications for quality characteristics such as Hagberg falling number and specific weight in cereals as a way of signalling to breeders what we're expecting varieties to meet," he concludes.

Plot scores

As well as an overall assessment of the trial, each individual plot is scored using a 1-4 scale.

Backstage access

AHDB is using its site in Norfolk to go behind the scenes and tell the story of how a RL trial is delivered.

Research roundup

From Theory to Field is part of AHDB's delivery of knowledge exchange on grower-funded research projects. *CPM* would like to thank AHDB for its support and in providing privileged access to staff and others involved in helping to put these articles together.

To access the AHDB's RL blogs: https://ahdb.org.uk/rl-trials

For more detail about the project visit: https://ahdb.org.uk/rl-project

AHDB
AGRICULTURE & HORTICULTURE DEVELOPMENT BOARD