> *Using agronomic merit as the basis for the digital tool gives a very different view of the RL.*

New perspective on RL

AHDB

from theory to field

A new variety selection tool has just been released by AHDB and provides a dynamic way of looking at the Recommended List. *CPM* finds out how it can rapidly sift through the varieties on offer to help pinpoint the ones most suitable for the farm.

By Lucy de la Pasture

When it comes to variety choice and management the AHDB Recommended List (RL) is the go-to source of information. Even though the RL already contains a huge amount of data, some of it can prove difficult to extract and even more complicated to analyse, according to the results of AHDB's Look Ahead activity which is designed to make sure the RL is fit for purpose.

As part of the project, a comprehensive survey found that the way people were using the RL was changing, explains AHDB's Dr Paul Gosling, who manages the RL programme.

Definite shift

"There was a definite shift in attitude from when the survey was last conducted, five years ago. Growers and agronomists are now attaching more importance to disease resistance ratings than they are to the headline yield figures," he explains.

So the decision was made to bring the RL to life and develop an interactive variety selection tool that enables growers to easily interrogate the RL's mine of information to find the varieties most suited to their situation.

Charged with making the RL into a dynamic digital tool is AHDB research data analyst, Dr Bastiaan Brak. He's been working with industry focus groups to make sure the new variety selection tool is intuitive to use and easily provides information that has previously taken a considerable amount of effort to prise from the RL in its static, two-dimensional format.

Underpinning the digital tool is the concept of agronomic merit, a metric that

Bastiaan Brak has developed the variety selection tool which allows users to interact with the Recommended List.

How is agronomic merit calculated?

Component	Importance*	Weighting*	Resistance rating**	Score (rating x weighting)
Septoria tritici	Very high	10	5.9	59.0
Yellow rust	High	7	5.4	37.8
Brown rust	Low	1	8.4	8.4
Mildew	High	7	4.9	34.3
Fusarium ear blight	Low	1	6.7	6.7
Eyespot	High	7	5.8	40.6
Lodging (+PGR)	Very high	10	8.0	80.0
Lodging (-PGR)	Medium	4	7.6	30.4
				297

*Default importance weightings for the North region displayed.
**RL resistance ratings use a simple scale: from 1 (least resistant) to 9 (most resistant). Ratings for Skyfall displayed.
Source: AHDB, 2019

aims to capture the genetic potential of varieties for their resistance to different diseases and lodging, explains Bastiaan.

Agronomic merit was first introduced in 2015 as a concept to assist the RL committee identify varieties with good agronomic traits that may have otherwise slipped through the selection net. The principle works by giving factors such as resistance to disease and standing ability an importance and 'weighting' them accordingly to provide an overall agronomic score for a variety.

"For example, *Septoria tritici* is of very high importance so it's given a weighting of 10. Thisfigure is used to multiply a variety's resistance rating to work out its agronomic merit for the trait. A disease of lower importance has a lower weighting and the overall agronomic merit of a variety is its combined score for all the agronomic traits," he explains.

Agronomic merit allows growers to look at the relative importance of individual diseases and lodging in their situation, either in isolation or in combination. The new tool makes light work of drawing out differences in varieties that could easily be overlooked when the RL is looked at on the page.

"The RL booklet compartmentalises the resistance ratings for each disease and does the same with the lodging data, but by using agronomic merit as the basis for the digital tool it gives a very different view of the RL," says Bastiaan.

The main interface for the tool appears as a simple graph, with agronomic merit plotted against a number of options for five-year yield data — UK treated, regional treated (East, West, North), UK untreated or UK treatment benefit — with the additional choice of using just the previous year's data for both UK untreated and UK treatment benefit information.

Interface of the new variety selection tool

Agronomic merit of varieties based on their untreated yield.
Source: AHDB Variety Selection tool, 2019

Agronomic merit

"Once the yield-type has been selected, the position of each variety on the graph is determined by its agronomic merit in relation to yield. An error bar is displayed so that it's very easy to see where yield is significantly different by how far apart varieties are vertically on the graph. Those with the best score for agronomic merit are found furthest to the right on the graph," he explains.

The default settings for each disease and lodging factor can be over-ridden by the user and given more or less importance, he continues.

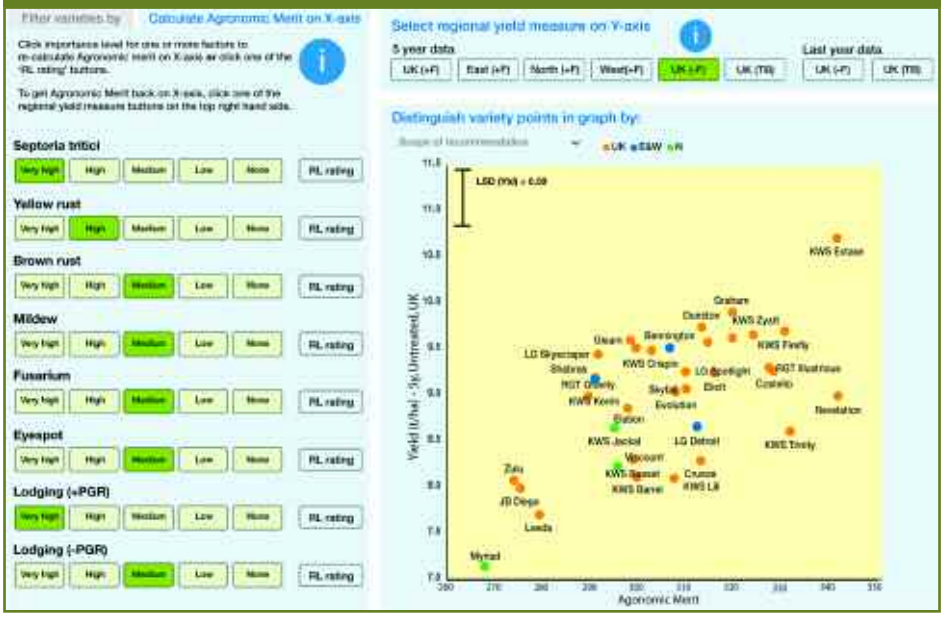
"The tool allows you to isolate any of the factors that make up agronomic merit. That means it's easy to look at how varieties relate to each other by — for example, just their resistance to septoria alone. Or if a disease such as fusarium ear blight is a known problem on the farm, then the user can increase its importance by clicking the relevant button. This then is reflected in the agronomic merit calculation and alters the position of the variety on the graph," explains Bastiaan.

Further filters can be used to remove unwanted varieties, narrowing the number shown to those relevant to the markets the crop is being grown for or above a certain disease or lodging rating selected. The output of the graph can be refined even further so that factors such as time of drilling, soil type, grain quality, sprouting resistance and orange wheat blossom midge resistance can all be taken into account.

Perhaps one of the most revealing yield criteria that can be selected is 'treatment benefit', which reveals the differences between varieties' response to fungicides. "This looks at both the treated and untreated data for a variety and gives a rough proxy of the economics of growing it," comments Bastiaan.

"Myriad is furthest to the left on the x-axis of the graph which indicates it has the lowest agronomic merit and is highest up the y-axis, showing it's the most responsive to fungicide treatments. In contrast, KWS Extase is the least responsive to fungicides ▸

The importance of agronomic factors can be adjusted



Source: AHDB Variety Selection tool, 2019

▸ but has a very similar agronomic merit to Revelation," he highlights.

Treatment benefit isn't available on a regional level because there aren't enough untreated variety trials to estimate a regional average but Bastiaan believes there will be a future opportunity to incorporate a harvest results tool within the variety selection tool.

"The harvest results tool would provide data from 6-8 locations with treated and untreated yields. This would only provide single year data but could be used to highlight the regional differences in treatment benefit between varieties," he comments.

Consistency in performance is something many growers will rate highly when selecting varieties and this information is easily available within the tool, across different seasons and regions.

"The RL resistance ratings and yield consistency data for a variety is visible in a pop-up box when you hover over it on the screen," he adds.

Developing the new digital tool hasn't been without its challenges, says Bastiaan. One of those has been to get all the necessary information on the tool's dashboard without it appearing confusing. He believes the extensive consultation process at every development stage of the tool has played a key part in developing something that growers and agronomists will find easy to use.

"As a developer, I understand the concept so it's very easy to become blind — everything seems very obvious. We've learned it's important not to develop the tool in isolation so, to keep on the right track, we've used a fresh focus group at each stage of the consultation process to make sure the tool is intuitive enough," he explains.

Paul believes the new digital tool will enable growers and agronomists to use the data already contained within the RL much more quickly and easily. It was launched alongside the new RL earlier this month, supported by a user guide.

Initially the variety selection tool will cover winter wheat and spring barley, but the intention is to add oilseed rape and winter barley over the winter, says Paul.

"The RL is continuing to evolve and in spring 2020, a new app will be available

Agile tool helps clarify variety choice

Will Hamilton sits as chair of the RL wheat committee but also farms 970ha on the Berwickshire coast in south-east Scotland. As such, he is a grower with an insider's view when it comes to making variety choices.

Even so, Will really rates the new variety selection tool Bastiaan has developed because it makes it easy to filter out unnecessary information which then clarifies variety choices.

"The RL is often criticised for containing too many varieties but by using the filters you can narrow down the choices to just a few varieties. For instance, here in Scotland there's no market for Group 1 milling wheats but there is a market for wheat for distilling so I can use the tool to screen out all the unsuitable varieties," he explains.

While Will is already very familiar with the varieties he currently grows, he believes the tool will enable him to look at new varieties as they come through and compare them with existing varieties.

"The tool makes it very easy to filter out varieties using their disease resistance ratings, so you can dismiss any with a septoria resistance rating below 5.7, for example. It also lets me reduce the importance of brown rust, which isn't a problem for us, and increase the importance of mildew which helps me assess their agronomic merit on my farm."

Four years ago, he rated markets as his number one variety selection criteria, with yield a close second and agronomic traits in third place. His emphasis has now completely changed, with agronomic traits coming first on the list when he appraises varieties and he pays closer attention to their untreated yields.

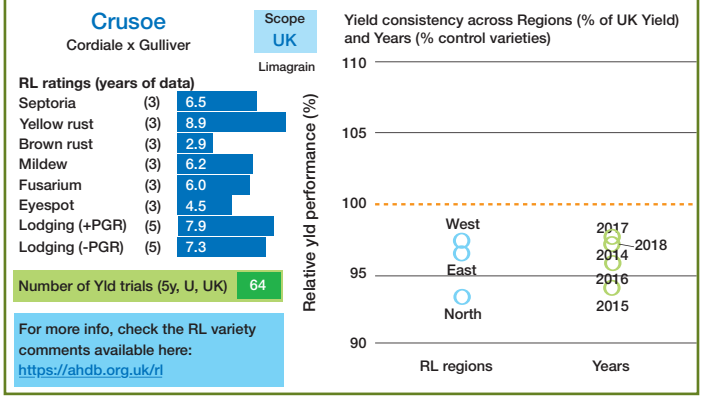
"Most growers attitudes to winter wheat have changed a lot in recent years and the economics of growing the crop has risen in importance. Wheat breeders have made huge advances in recent years and varieties which are even better agronomically are on the way, which is very encouraging," he says.

"But there are a lot of challenges coming up, with the loss of active ingredients and increasing pathogen resistance, but there's also uncertainty about how the politics will evolve. The loss of chlorothalonil has significantly altered my variety priorities, with resistance to *Septoria tritici* now of number one importance, even with two new fungicides on the way," he comments.

Will Hamilton believes the new variety selection tool will help him screen new varieties suitable to find the most suitable ones for his farm.

Will has watched the variety selection tool evolve since Bastiaan produced the first prototype and he describes the end result as 'flexible and easy to work.' He believes that once growers have spent 10-15 mins familiarising themselves with the tool then they'll probably find they agree.

Variety data and consistency



Source: AHDB Variety Selection tool, 2019

which has been designed to replace the pocketbook. The app will provide live updates to any key changes to disease ratings and will be welcomed by agronomists who are increasingly going paperless," adds Paul.

"In the longer term, the RL will stop assessing winter wheat varieties for resistance to *Septoria nodorum* and winter barley for yellow rust as both have become of relatively low importance in those crops."

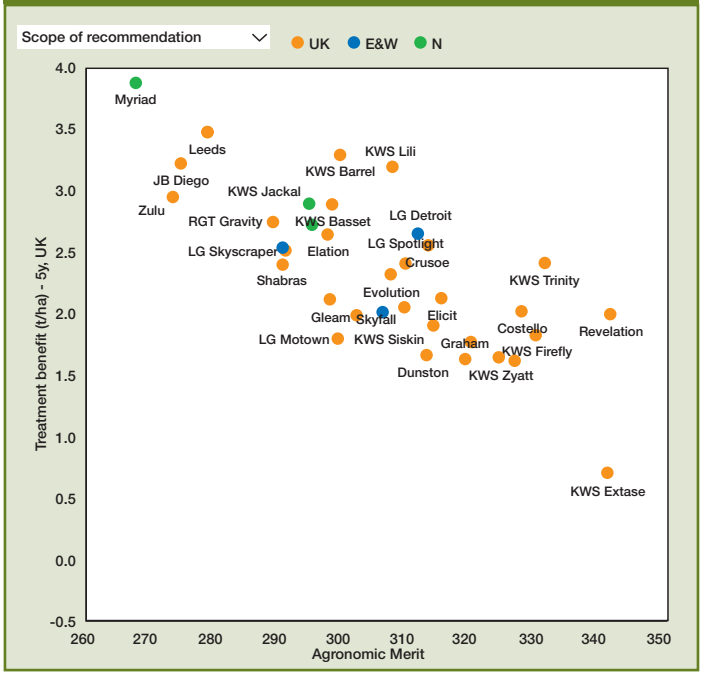
OSR varieties will be subject to additional tests for verticillium wilt and pod shatter and for the first time the RL will consider vigour, he says.

"The aim is to look at what vigour is and how it can be measured. There appears to be a high correlation between vigour and seed quality/seedbed preparations. So we need to address whether these factors are more important to a variety's inherent vigour."

AHDB also intends to respond to calls to speed up the flow of information, adds Paul. "The new RL is available online in Dec and the objective will be to produce the RL booklet a month earlier than previously."

The variety selection tool can be found at *ahdb.org.uk/vst* ■

Treatment benefit shows variety differences



Source: AHDB Variety Selection tool, 2019

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