

To be the perfect wheat

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Technical Agri-Intelligence

Agrii draws together its trials-based knowledge and experience on managing and monitoring the UK’s cereals varieties into Advisory Lists. CPM gets exclusive insight into what they reveal.

By Tom Allen-Stevens

37. That’s the score of perfection, according to Agrii — no cereal variety available to UK growers could currently score higher in its sustainability rankings. Although wouldn’t you like to know which ones come close?

Agrii’s Advisory Lists are like a little black book of privileged information each of the company’s agronomists carries around with them. They’ll share the information with their farmers to gauge how a wheat or barley variety will or won’t perform in a particular situation, but the lists themselves remain tightly under wraps.

Not even CPM got to feast fully on the figures. A carefully redacted version was used as the basis of a detailed discussion about the sustainability of the UK’s leading cereal varieties with one of the main architects of the lists, Colin Lloyd. But there were a few gems he revealed you won’t find on AHDB’s Recommended Lists.

“Skyfall scores highest on our wheat list,

with an overall sustainable score of 30,” he reports. “It’s not the highest performing wheat on yield but has good consistency. It scores as one of the best on grassweed competitiveness, though, you can sow it as late as end of Feb with confidence and it has OWBM resistance.

“We put its yellow rust score at 3.4, while it’s on the RL at 5.2. That’s not good, but it’s been the same for the past three years, so as long as the grower and agronomist are working together, it’s a score that can be managed.”

Grassweed competitiveness

KWS Extase may perform better on paper, but doesn’t quite match Skyfall, says Colin. “The disease scores are good, and ours are largely in line with the RL for Extase. But we’ve found it doesn’t compete quite as well against grassweeds and there’s no OWBM resistance. However, on lighter land the variety’s one of my favourites.”

KWS Lili comes in at a sustainable score of 22, which is a shade above the average of 21 over the 34 leading winter wheat varieties on the Agrii list (which includes 32 of the 35 on the 2020/21 RL). “Latest safe sowing date is where Lili falls down — the RL suggests mid Feb, but we’ve found the variety stops performing relative to some others at the end of Dec.”

Then there’s KWS Zyatt. “There’s a load of good things to say about Zyatt — its treated and untreated yield, grassweed competitiveness is decent, performance as a second wheat is good. But we’ve pegged the yellow rust score at 3.7, almost half the

RL value. It’s crucial growers don’t fall foul here.”

This is where Colin believes the Agrii lists have a particular strength. The aim of the lists is to provide Agrii agronomists and their growers with the extra intelligence needed to make an informed choice, not only on which wheat and barley varieties to grow, but how to manage them. They complement, but don’t replace the RL, Colin insists. “We make assessments of yield consistency and resilience under disease pressure, from the RL data alongside our own assessments of grassweed competitiveness, soil type and drilling date suitability. What we’ve done is to draw this intelligence together to give growers a measure of variety sustainability.”



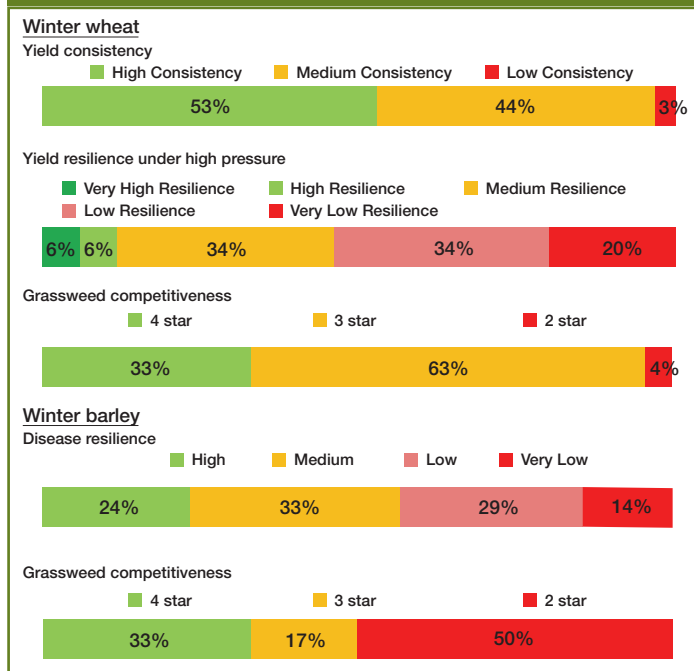
Colin Lloyd is one of the main architects of the Advisory Lists and uses them to provide a unique insight into variety strengths and weaknesses.

Agrii yellow rust diversification group 2020

		Pedigree group									
		A - Hereford	B - Timaru	C - Claire/JB Diego	D - Cadenza	E - Cassius	F - Shepherd	G - Scout	H - KWS Santiago	K - Cougar	Other
Pathology group	1	<i>LG Sundance</i>	KWS Siskin KWS Crispin Costello KWS Parkin	<i>LG Skyscraper</i> Revelation		<i>LG Sundance</i> <i>LG Skyscraper</i>	<i>Revelation</i>		<i>LG Skyscraper</i> <i>RGT Saki</i>	<i>RGT Saki</i>	Crusoe KWS Extase Theodore
	2	Gleam <i>Shabras</i>	KWS Lili	LG Spotlight	KWS Lili KWS Barrel	Shabras KWS Basset Elation Elicit KWS Jackal		KWS Basset RGT Gravity	RGT Gravity KWS Jackal	KWS Firefly	Graham RGT Lantern
	3	KWS Zyatt Dunston SY Insitor		Zulu Bennington KWS Kinetic	KWS Zyatt	KWS Kerrin	Dunston		KWS Kerrin		Skyfall

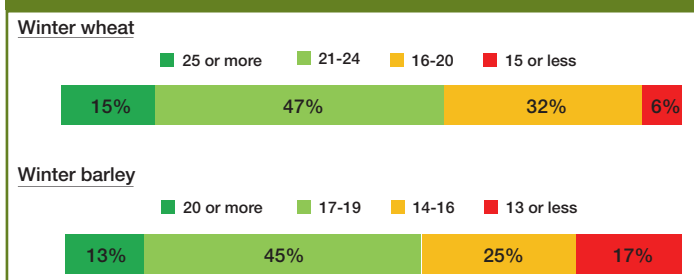
Source: Agrii, 2020. Varieties in italics feature in two pedigree groups.

What the Advisory Lists show



Source: Agrii, 2020. Scores indicate proportion of 34 wheat varieties rated (including 32 of the 35 on the 2020/21 RL) and 23 barley varieties (including 19 of the 24 on the 2020/21 RL).

Current variety sustainability ratings



Source: Agrii, 2020. Bands indicate proportion of varieties rated. 21 wheat varieties are rated at or above the initial Agrii minimum wheat target of 21 (range 14-30), while 14 barley varieties score above the minimum of 17 (range 9-25).

The disease monitoring is carried out across Agrii's network of trial sites, 12 of which have unique tussock plots. Each of these contains 35 varieties specially selected to gauge how the yellow rust population

is evolving and pulling on the genetics of the UK commercial wheat varieties. The work is overseen by independent specialist and one of the UK's foremost experts on the disease Dr Rosemary Bayles.

"Many of the varieties in the tussocks are parental lines and this indicates which specific varieties may be at risk," explains Colin. "We know quickly if something appears that shouldn't be there and this gives us real-time data to confirm that what we're seeing in the field is statistically robust. That allows us to steer agronomists to varieties that warrant vigilance."

Crucial role

This early warning system has played a crucial role in calling out the Achilles heel in a wheat variety's defence, he maintains. "The stability of our genetics in the UK is a strength, but we mustn't take it for granted. JB Diego, for instance, was on the RL for 11 years and with good reason — it has good grain characteristics and stiff straw. Its yellow rust score held at around 8, but we spotted the breakdown in year 8 and gave it a score of 3.1. As long as you were aware, you could do something about it, but those who weren't were let down by a variety they'd come to rely on."

It's been the same with Torch and then Reflection and now there's a new threat moving through the UK wheats. "We first saw instances of the breakdown of Hereford crosses in 2017 and issued an amber alert," notes Colin. "The concern is that a lot of the varieties on the RL have Hereford in their parentage. In 2018, half the sites were expressing instances of breakdown and we changed from amber to red alert for



Agrii issued an amber alert on Hereford crosses in 2017 following instances of breakdown to yellow rust.

those crosses."

The Hereford race, as it's become known, was first spotted in Sweden in 2015 and was flagged by the Global Rust Reference Centre at Aarhus University, Denmark. In the following year, 11 new winter wheat varieties with Hereford in their parentage joined the RL, including Zyatt, Dunston, Shabras and LG Sundance.

"Sundance hasn't shown signs of breaking, but others have, ▶



On lighter land KWS Extase is one of Colin's favourites, but it's not such a good performer against grassweeds.



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Many of the varieties in the tussock plots are parental lines and offer an early warning on specific varieties which may be at risk.

► and that now includes Gleam and newcomer SY Insitor,” reports Colin.

As well as forming the basis for issuing in-season alerts to Agrii agronomists (and samples are sent in to the UK Cereal Pathogen Virulence Survey), the information the company compiles is used to update a rust diversification group (see table on p35).

“There are plenty of good reasons for growing Gleam, for example, and although it’s expressing yellow rust, that’s not at every site and in every season. But think about the other varieties grown close to it, and how they are related in terms of pathology or pedigree group. The diversification groupings are rarely talked about these days, but they still have an important role to play.”

Lodging is another area that receives special attention in Agrii’s trial plots. “Standing power is one of the most important traits and the numbers on the RL don’t really tell you how the varieties differ. So we take the wheats and push them hard, almost to the point of harshness, with two different seed rates and five PGR programmes to get a true picture of how they perform,” says Colin.

The result is that over half the varieties on Agrii’s Advisory Lists have an untreated lodging score one full point or more below

that shown on the RL. The divergence is greater on disease, with 88% of wheats a point or more below on at least one of the three main diseases. “The main problem is with the rusts — we score 63% of varieties at least a point below on brown rust and almost half are more than one point lower on yellow rust.”

Colin doesn’t believe this devalues the RL, though. “We’re doing a different job to AHDB, working with real-time data and stretching varieties to expose their weaknesses. It’s little wonder our sustainability scores differ from the resilience rating you’ll find on the RL.”

Similar work on winter barley has resulted in a list of 23 varieties. Here the average sustainability ranking is 17, with the best scoring 25 and the worst 9. “The differences between the varieties can be quite large, and these don’t always stand out from the RL,” Colin notes.

“One factor we take into consideration is BYDV tolerance, that will have an increasingly significant role with the loss of neonicotinoid seed dressings. We also put the varieties through their paces in punishing lodging trials at our trials site near Wisbech.”

Widely grown

Agrii gives KWS Cassia a score of 17, for example, against KWS Tower’s sustainability ranking of 10, which Colin says explains why the older variety is still so widely grown. There are also varieties on the list you won’t see on the RL, such as Memento, the company’s biggest-selling two-row barley. A fungicide-treated yield of 103% of controls and a consistently high specific weight of 69.6kg/hl nudge it up the rankings and make it an attractive variety, he explains.

“It doesn’t score so well on grassweed competitiveness as with other two-row varieties, while there are several that do, especially the six-row hybrids. As a species for cultural control of blackgrass, barley certainly



Varieties are put through their paces in punishing lodging trials.

has a role.”

Taken as a whole, the sustainability ratings offer a technically robust way to identify varieties with the greatest agronomic strength, least production risk and lowest environmental impact, he says. “It’s about the reliability of their performance and flexibility in how you manage them — you don’t want to have to spray your entire cereal area on the same day.”

And across the board, there are plenty of current wheat and barley varieties in every group that have ratings at or above where Agrii has set the minimum targets. “Within the industry

there’s still a fixation on yield — it’s the main criteria to get on the RL, for example. We believe the sustainability of a variety will become a far more reliable way to gauge on-farm performance, providing you have robust metrics to measure it.

“It will also be a better way to judge a variety as breeding improvements introduce new traits and a greater role for genetics in commercial cereal production — BYDV resistance in RGT Wolverine, for example, is a good indication of where wheats will go in the future.”

What’s more, unlike the RL, the sustainability ratings give a good indication of how varietal performance as a whole progresses — a variety will keep the same score, which will only change if one of its attributes changes, such as breakdown of yellow rust resistance.

“Every year breeders are raising the bar, so 37 is the current perfect score for winter wheat today, but technologies such as gene-editing could offer opportunities to significantly raise the genetic profile of varieties available to growers. As this happens, the sustainability score offers an objective way to value the contribution these exciting developments could bring,” Colin concludes. ■

Agri-Intelligence update

Through the country’s most extensive agronomy research and development network, Agrii is focussed on delivering the extra value growers need in a fast-changing and increasingly challenging crop production world; value which keeps them firmly ahead in a future where overall cropping sustainability is at least as important as individual crop performance.

Following on from the series of articles developed from 2013, the company’s R&D team have provided CPM with exclusive insights into findings from some of today’s most practical crop improvement work.

This includes taking advantage of the best available variety intelligence; tailoring nutrition for winter and spring crops; employing new technologies and approaches to sustainable agronomy; and making the most of modern spring cropping.

We hope you find these insights valuable in helping you optimise your production costs; minimise your risk; take advantage of your best new opportunities; maximise your performance; simplify your management; and, above all, secure a more sustainable farming future.

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