KWS UK

2022 Variety Guide

SEEDING
THE FUTURE
SINCE 1856

KWS

KWS Tardis - pictured above

Contents

Introduction

The KWS Variety Guide is a catalogue of cereals, oilseeds, hybrid rye, peas, maize and sugar beet.

This guide is intended to give growers and professional advisers the information needed to guide variety choice based on market suitability, regional performance and some of the practical aspects of management that determine how a variety does on farm.

This year, we've included much more information to help guide more specific choices. This includes end-user requirements of the various market groups and other factors that can influence performance like drilling date and what makes a good 'late driller'. In addition, we also go into detail on new developments in plant breeding, such as how tolerance to Barley Yellow Dwarf Virus (BYDV) works and what it offers growers.

All figures in the guide are sourced from the AHDB 2022/23 Recommended List, unless otherwise indicated.

If you have any questions or would like further information on our varieties, please do not hesitate to contact the KWS UK team. See Page 6 for details.

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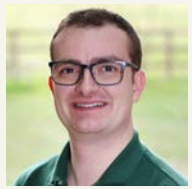

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Cereals 360 is here!

We've missed seeing you in the field the last few summers, but you can still get all the information you need from our virtual crop tour. Cereals 360 makes it possible to experience all our key varieties of barley, hybrid rye, oilseed rape and wheat.

Discover the exciting experience that provides a virtual crop tour across all of our key varieties of barley, hybrid rye, oilseed rape and wheat!

Learn as you listen to KWS experts talking through our main crop portfolio covering yield, agronomy, end markets and disease resistance whilst observing the crop in the field.

Cereals 360 is accessible wherever, whenever, from the comfort of your own home across computers, or out in the field on tablets and mobile.

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HANDY TIP!

When scanning the QR code: Open your camera and hold your device so that the QR code appears in the viewfinder. Your device should then recognise the QR code and show a notification. From here, simply tap the notification to open the Cereals 360 link. For Android, long-press the Home button and click 'What's on my screen?'

my KWS

myKWS: Service for your seeds

High-quality seeds are the foundation of successful farming. However, to really unleash the full potential of your seeds, area-specific crop management and holistic decision-making are just as important.

With myKWS, we now can expand our services. The combination of high-quality seeds + regional advice + digital service enables us to provide a firm foundation for important decisions and future paths to successful farming.

More than 50,000 farmers are using myKWS already.

Join in and take advantage of these new opportunities at: **www.kws-uk.com/mykws** or scan the QR code to create your account now!

SOWING4*PEAK PERFORMANCE*

The future of crop production genetics, today

Sowing for Peak Performance (SPP) is KWS's fundamental breeding objective that underpins all cereal genetic development now and into the future.

It's based on the premise that 80% of your crop's potential is locked in by the seed you buy and sow. Whilst, of course, you can fine-tune this with the correct Nitrogen levels, using fungicides to protect it from disease and paying attention to basic management principles, once you've made your variety choice, your production potential is largely set.

So to get the best performance on your farm, it is critical that when you choose your variety, you are using a wealth of data to tailor your choice for both your farm and individual field situation. That's important now and will become increasingly more so in the future.

We're entering uncharted waters when it comes to crop production in the years ahead, with many of the accepted principles and practices we have taken for granted coming under greater scrutiny. Much of the chemistry we have come to rely on is slowly being lost to revocation and what we have left is facing increased resistance. Our use of essential Nitrogen is also under pressure due to growing environmental concerns, the challenge of reducing the carbon footprint of crop production generally and worries over the loss of Nitrogen from the ecosystem. Global warming is changing our climate with more extreme weather events predicted and widening variability in growing conditions, often within the same season.

And all this is happening against the backdrop of a global population growing towards 9.0bn in the next 25 years.

It's time for action!

The way we have produced crops in the past is not the way we will in the future. What has got us to this point in our agricultural evolution will not take us where we need to be without substantial changes.

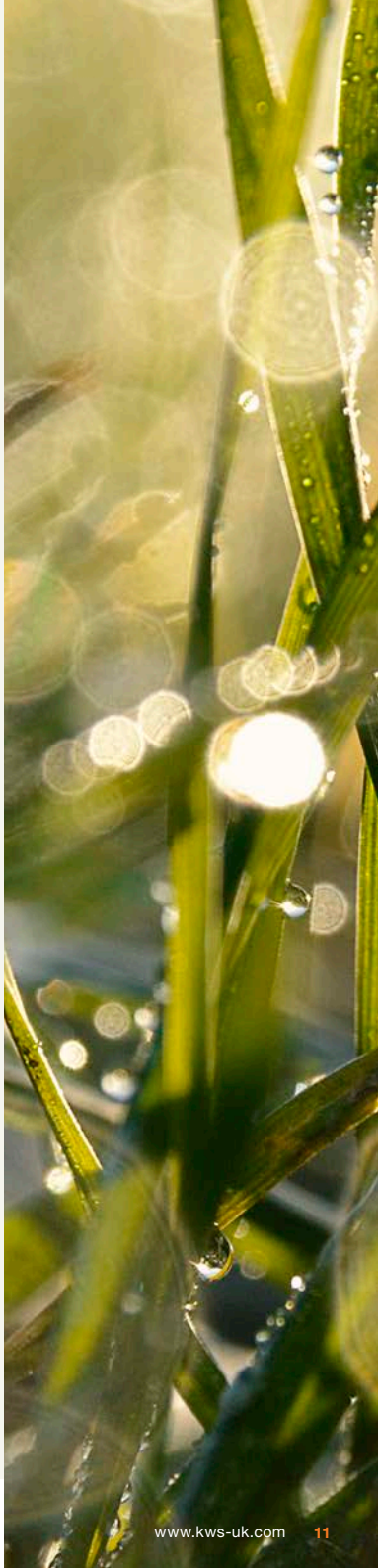
At KWS, we've always been passionate about genetics and the vital role seeds play in the production equation. We're proud of what we have achieved to date and appreciate the key role our genetics can play in responding to the demands of the future.

Working with businesses across the agri-supply chain, we've identified five critical needs that growers must address to keep their business profitable and environmentally sustainable in the years ahead. Each of these carries a commitment from KWS to ensure our genetics address these as far as possible.

5 key requirements for profitable and sustainable UK crops and how SPP can help now and in the future:

1 To maximise production/profitability from available resources

- Getting the most production from the resources you have available to you is the key to being sustainable.
- KWS provides a range of high-yielding varieties with an assortment of specific agronomic traits. Select your variety based on your soil type, growing conditions, locality to market and maximise your yields.



2 To achieve effective crop management with reduced windows of opportunity

- Climate change has become a reality for many growers over the last few years with growing conditions not just varying dramatically between the years but also within the same season itself.
- KWS actively select for high resilience so that they can help on farm, spreading workloads at critical times and buying you time. Note that varieties outside of your usual market segments may be used to widen spray windows and harvest timings.

3 To achieve optimum crop health without a high level of agronomic interventions

- Striving to breed varieties with high levels of resistance to the most damaging diseases has been a key KWS aim for many years. Our current portfolio is strong proof of this with some of the highest scores for untreated yields, resistance to *Septoria*, Mildew, and Rusts on the RL.
- But if growing a less resistant type for a specific market requirement, adapt your management practices to boost disease resistance e.g. later drilling of wheats will increase *Septoria* resistance scores.

4 To reduce amount of all inputs used and associated costs

- It's not just about cutting fungicide spend; by choosing the right variety, you could save more on labour, diesel and machinery wear and tear and ultimately replacement too.

5 To get greater productivity from soils long-term

- Less travel means less potential damage to soils and less time and money spent trying to correct the compaction problems associated with multiple wheelings, and carrying out operations in unsuitable conditions.
- From considering how varieties can perform in direct drilled situations through to those that are stiff strawed, variety selection can be tailored to your farm.

So how can SPP help me today?

Every farm is unique, and each farm business has different goals – which makes variety choice highly personal.

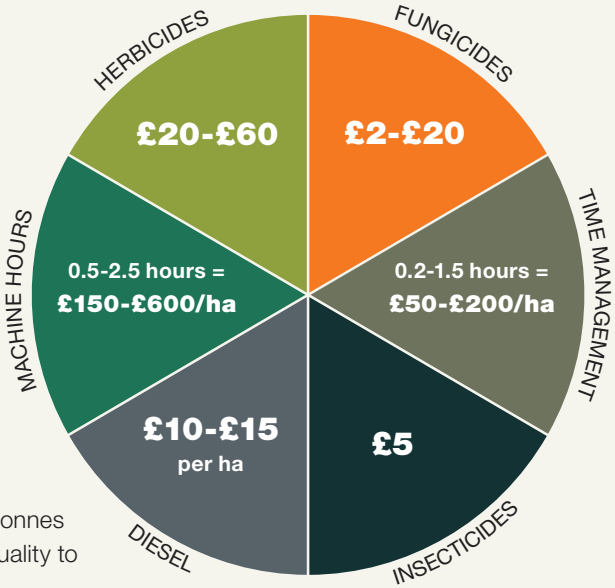
However, by using KWS's SPP ethos, growers can be assured that proactive variety choice will fix 80% of your crop performance. This will pay off, both in cost and time, at time of sowing, during the growing season, and through to harvest.

SAVINGS IN:

- Time management
- Machine hours
- Fungicides
- Herbicides
- Insecticides
- Diesel

BENEFITS TO YOU:

- Better plant health
- Improved soil quality
- Reduced carbon footprint
- Increased output = extra tonnes
- Higher chance of better quality to attain premiums on offer

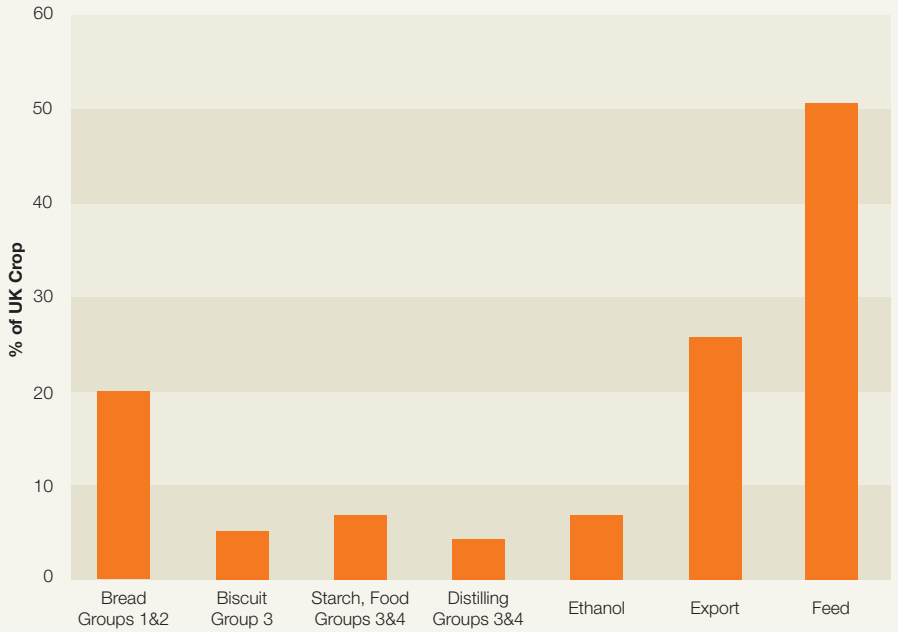


Winter Wheat

Wheat demand

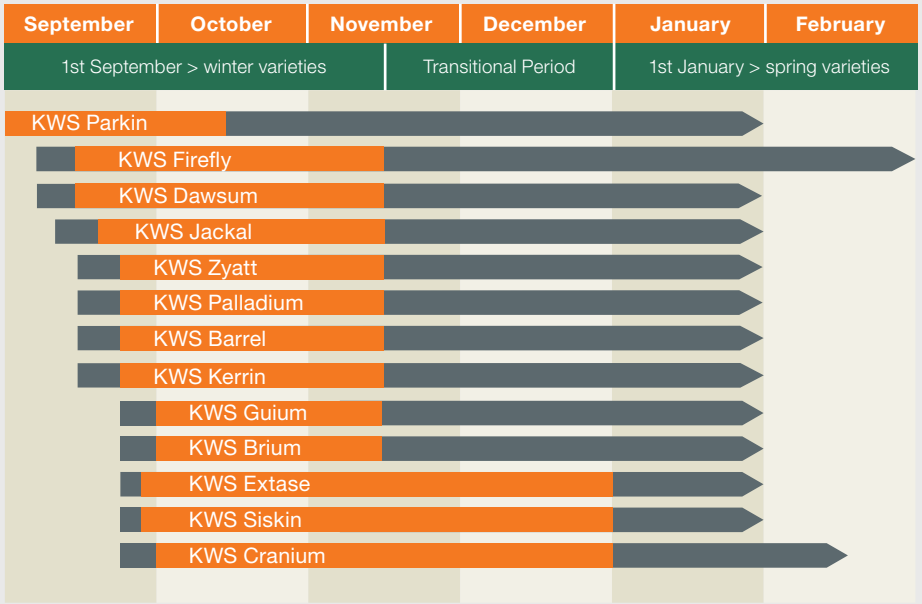
Each year in the UK, flour millers use some 5 million tonnes of wheat to produce over 4 million tonnes of flour, with approximately 60% used for bread making. Pre-packed flour, as seen on supermarket shelves, constitutes approximately 4% of the market. Approximately 5.5% of the total flour produced is exported annually. Other users of flour include the biscuit and cake industries, starch manufacturers, and food ingredient companies (data source: UK Flour Miller). Then, export and feed make up the balance of the UK wheat crop destination.

Graph 1: UK Wheat Demand



Data Source: 5 years average DEFRA Statistics

Wheat optimum drilling times



Our varieties will perform well up until the official latest safe sowing date. However, from our experience, the optimum sowing windows are marked in orange, and this is when you can expect them to give their peak performance.

When planning your cropping strategy, pick varieties that will provide the best performance based on your unique farm circumstances. Sowing date is one key factor, but to find out how to get the ultimate peak performance from your cropping strategy, see page 10.

Key wheat disease considerations

Arguably, the most important yield-robbing diseases in winter wheat are *Septoria* and yellow rust. With chemistry starting to drop out of the picture, genetic resistance is becoming a key element in profitable wheat production in the UK. Here we bring you up to date on the latest thinking during this transition period as wheat genetics become considered, by some, as tank-mix partners in their season management.

Septoria tritici

The most destructive disease in UK wheat, which in extreme cases has been shown to decrease yield by up to 50%. Current resistances are based mostly around plant breeders stacking partial resistant genes, which have cumulative small effects with increased durability as opposed to using major genes. With the loss of Chlorothalonil™, many growers are focusing more than ever on highly resistant varieties such as KWS Extase.

During the 2020/21 season, weather events including rain in May, stretched T1 timings, putting resistance genetics under extreme pressure. As a result, we observed the breakdown of the Cougar race of resistance across the UK wheat crop, with any progeny containing Cougar genetics being adversely affected. While it is impossible to predict how the *Septoria* population will evolve, growers are advised to consult the Recommended List and study disease resistance ratings that reflect recent pathogen populations.

In the past, *Septoria* ratings have been based on a 3-year dataset. Due to the extreme pressure observed in 2021, 1 year and 3-year ratings are presented on the 2022/23 Recommended List.

Disease-risk map for *septoria tritici*

Source: AHDB

Varieties like Extase with resistances well above 6.0 offer opportunities to reduce fungicide costs, especially in lower risk seasons and later drillings. More importantly, they help deliver effective disease control in high-pressure seasons when critical fungicide timings may slip.

If you want to learn more about how varieties can contribute to the successful control of *Septoria*, then use this QR code to link to our video which highlights the work KWS are involved in and see how chemistry and genetics can work together to best control this disease.

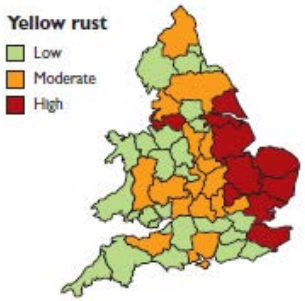
Yellow rust

Yellow rust is one of the most important wheat diseases in the East, although in recent years infection has become common across all regions of the UK.

Yield losses of 40-50% often occur in untreated, susceptible wheat varieties. In crops that are early sown, there is an increased risk due to exposure to a green bridge from the previous crop and the mild winter weather followed by a humid microclimate. Late sown crops are also more at risk as the plants are smaller throughout the year. While many growers have relied on well-timed, structured fungicide programmes to control the disease, the potential loss of epoxiconazole and tebuconazole based chemistry from 2023 means that genetics may be required to do more of the 'heavy-lifting' in yellow rust control.

In the past, yellow rust ratings on the RL have been based on a 3-year dataset of adult plant yellow rust resistance. Yellow rust races are dynamic with pathogen race variations, causing a constant threat. The UK Cereals Pathogen Survey, defining current juvenile plant resistance and the new AHDB Yellow Rust Watch List, adds useful layers of information to the largely historic disease information contained in the RL.

KWS supports all these activities as it provides more information for farmers, helping them make the right variety choices for their individual growing situation and to plan their crop management accordingly. We are also excited that some of our newest additions to our wheat portfolio, such as KWS Cranium and KWS Dawsum, not only add yellow rust resilience with OWBM resistance, they also add high yield potential with seedling yellow rust resistance to the wheat market.



Yellow rust risk in 2007


Yellow rust risk in 2021

Source AHDB

	UK Treated Yield (% controls)	Adult RL YR rating	CVPS seedling resistance
KWS Dawsum	104	9	Resistant
SY Insitor	104	5	Susceptible
Gleam	103	5	Susceptible
KWS Cranium	102	8	Resistant
KWS Guium	102	9	Resistant
Graham	102	7	Susceptible
KWS Palladium	100	9	Resistant
Costello	100	9	Resistant
Skyfall	97	3	Susceptible

Data Source: AHDB Winter Wheat RL 20-22/23, UKCVPS 2021/22

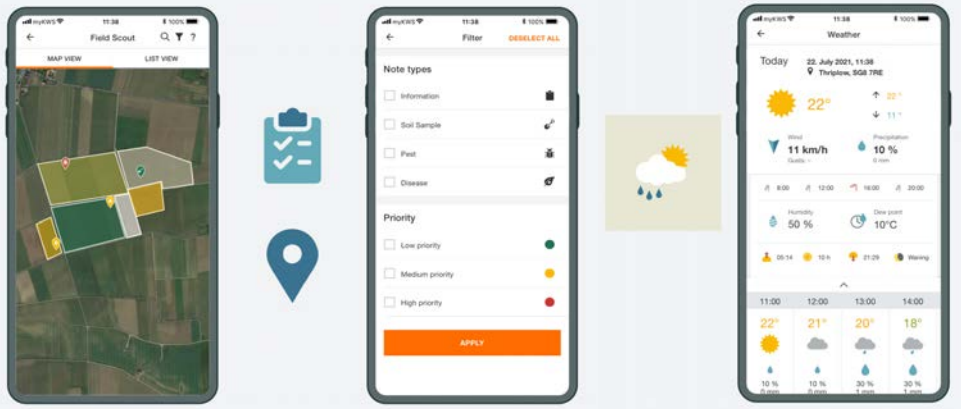
my KWS

Seed + Service: Increase your yield with the help of myKWS

Get even more with the myKWS app! The use of myKWS and the corresponding app is free of charge. You have free access to all basic functions such as seasonal expert information, calculators and field management. If you would like to use the satellite-based digital services for your KWS varieties, all you need to do is take a photo of your delivery note and register quickly at the beginning of the season.

Create important notes about your site-specific observations on the fields; for example, the detection of pest or disease infestation can be recorded at the exact location with the myKWS app. Use the Field Scout to manage important information and have a better overview of your fields and crops.

myKWS also offers damage symptoms finders, accurate weather data and much more!



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Group 1

Wheat varieties within this sector are those that are used by millers for breadmaking and give year-on-year consistent milling and baking performance. They will achieve a premium if they meet specified quality requirements of 13% protein, 250s Hagberg Falling Number and 76kg/hl specific weight. Premiums for lower specification Group 1s (so-called low protein low HFN contracts) may be available – it's always best to check with your local market on their precise requirements.

SPECIFICATION	Group 1 Specs	UKP Specs
Protein	13%	11.0% - 13.0%
HFN	250	250
Specific weight (kg/hl)	76.0	76.0
Max. moisture content (%)	15%	14%
Max. admix	2%	2%
W	-	Min. 170
P/L	-	Max. 0.9

Group 1 varieties

KWS ZYATT

AHDB RECOMMENDED

Details

Group	Year Listed	UK treated yield	Parentage
1	2017	98%	Hereford x KWS Quartz

Comments

KWS Zyatt is the highest yielding Group 1 on the Recommended List. Commercial experience in the mill and bakery has shown the variety delivers excellent protein functionality, making it suitable for use in a wide range of bread applications. A specific weight of 77.5kg/hl, a HFN of 260 seconds and a milling specification protein of 13.1%, combined with its group leading yield across all regions and soil types and its UKP export-approved status, make it the leading Group 1 wheat.

KWS Zyatt has one of the highest untreated yields of all Group 1 varieties, at 76% of the untreated controls. Its combination of good disease resistance, including a score of 6.1 for *Septoria tritici*, 4 for yellow rust and 6 for brown rust, make it a compelling variety proposition. KWS Zyatt now has a strong on farm following for its second wheat performance, and when combined with its disease resistance, stiff straw and mid-maturity, it is the stand-out variety for both first and second wheat positions.

KWS Zyatt – use your loaf

In today's challenging times, finding the best local market and the right variety to fulfil it will be crucial for growers looking to maximise their farm's potential. To achieve this, those close to a flour mill or port should have KWS Zyatt earmarked as one of their top varieties to consider growing this autumn; since being added to the AHDB Recommended List in 2017, it has earned a reputation as a consistent performer in the Group 1 sector.

Moreover, KWS Zyatt's excellent physical grain package is supported by its tried and tested results from the UK baking industry, where it has been shown to deliver a wide range of good quality end-use products.

Yields are 1% ahead of the next best Group 1 milling wheat and in the AHDB East and West, where over 80% of Group 1 plantings can be found, it delivers consistently high yields.

But there's more to KWS Zyatt than just milling performance. For those looking for a wheat that performs well in the second wheat slot or one with a good, balanced disease package, then Zyatt will be a good option.

KWS Zyatt is stiff strawed and has solid eyespot resistance, appearing to be one of those varieties that is a naturally good second cereal. Its grain quality is strong, so its seed rates can be pushed without compromising grain quality.

"KWS Zyatt has impressed us with its consistently good baking performance and versatility across a range of applications."

Shaun Taylor
Technical Director of Hovis Bakeries

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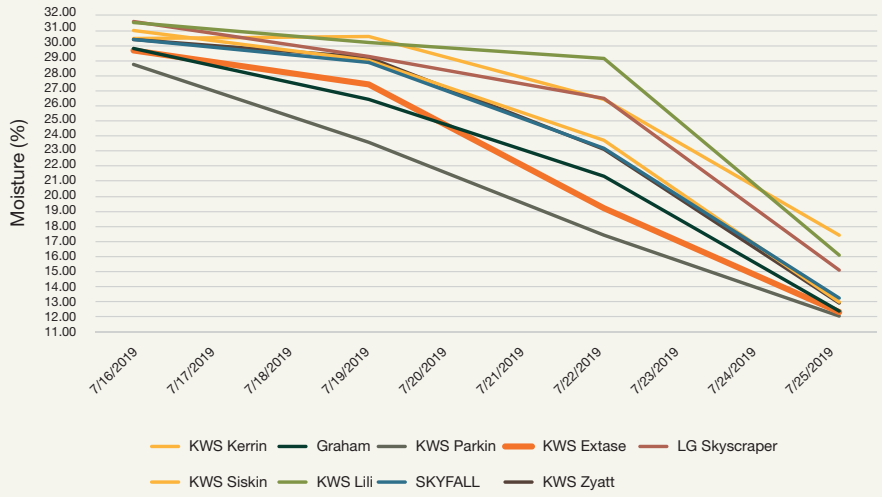
Group 2

Varieties in Group 2 are routinely used in the bakery for breadmaking but may have other bakery applications too. As a result, they could have specific end-use characteristics which are not suited to all grists. Consequently, these varieties are likely to attract varying market prices. Lower protein Group 2 wheats are also widely used by millers but will attract variable premiums - it's always best to check with your local market on their precise requirements.

SPECIFICATION	Group 2 Specs	UKP Specs
Protein	12.5%	11.0% - 13.0%
HFN	250	250
Specific weight (kg/hl)	76.0	76.0
Max. moisture content (%)	15%	14%
Max. admix	2%	2%
W	-	Min. 170
P/L	-	Max. 0.9

Graph 2: Drydown of Milling Wheats (Group 1 & 2) in KWS trials, Harvest 2019



Data Source: KWS Trials, Harvest 2019

Group 2 varieties

KWS EXTASE

AHDB RECOMMENDED

360

Details

Group	Year Listed	UK treated yield	Parentage
2	2019	101%	Boisseau x Solheio

Comments

Arguably the most exciting variety to come on to the Recommended List since the turn of the millennium, KWS Extase is the best example of the new generation of wheats that combine market value, high yield and outstanding disease resistance.

A specific weight of 78.5 kg/hl, a HFN of 289 seconds – one of the highest scores for both characteristics of any recommended breadmaking wheat – and a milling specification protein of 12.7% make it the outstanding choice in this market group. It is also the only Group 2 variety to be supported by a buy-back contract for full milling specification through to lower protein flours by a national miller.

Its exceptional untreated yield of 93% of treated controls is 3% ahead of the next best-performing variety and owes much to its unprecedented resistance to *Septoria tritici*. For this resistance, Extase has a score of 7.8 and was the first UK variety to be awarded a score over an 8.0 when it was first recommended. It also boasts an 8 for yellow rust and a 7 for brown rust.

KWS Extase is a French-bred, quality wheat that is performing well across northern Europe. It brings new genetics to the UK, but just as with Skyfall, it fits well with the conditions we have. With stiff, strong straw and as one of the earliest maturing varieties on the RL (see graph 2 on page 23), it will appeal strongly to those in the East and those looking for complementary varieties to spread the harvest workload. This maturity and good wet-weather disease resistance will also support its appeal to those in the West and North.

Its speed of movement through stem extension is faster than average and closer to that of varieties such as Gallant, so growers will want to prioritise it ahead of others when planning spring fertiliser schedules.

Care must be taken in planning sowing to make the biggest advantage of earliness. Sowing later maturity crops before earlier ones can nullify an advantage. We would suggest sowing KWS Exstase before KWS Siskin. Early maturity is a key characteristic for any milling type, ensuring that grain quality is preserved, especially in a catchy harvest.

Since the 20th May 2020, you can no longer apply Chlorothalonil™, which puts a hole in *Septoria* control for many growers. Increasingly good genetics are being realised on farm as a key part of the solution, with KWS Extase being the variety of choice for many. KWS recommend a spray programme tailored to the situation and season with at least two modes of action in each tank-mix at the two main timings. Growers are urged to protect genetics, so preserving KWS Extase as a key variety on farm today and in the future.

The growers experience

"On paper, KWS Extase looked like an exciting new addition to the 2019/20 RL, and having drilled it in autumn 2018, its performance did not disappoint. This harvest yielded well, ranging from 11.9 - 12.6 t/ha with an excellent sample of great looking wheat. What's more, we sold loads into our local miller at full Group 2 specification. With the disease pressures ahead, KWS Extase is certainly a key variety we will be drilling this season and beyond.

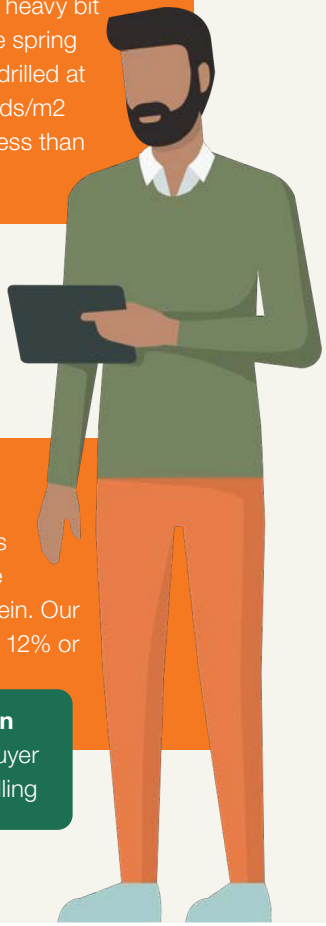
"It was spotlessly clean - the cleanest variety I've seen - although you still get a decent return from what you invest in it. I could tell it was a different variety when it emerged - we'd put it in a heavy bit of dirt and expected large losses. But, oh my God, in the spring it flew out of the blocks. It's a very vigorous variety, and drilled at the end of Sept, early Oct, I'd say no more than 350 seeds/m2 is about right - around 25 seeds/m2 less than you'd want for KWS Siskin."

Andrew Robinson
Toddington Farms,
Bedfordshire

The millers experience

"Since issuing the buy-back contracts in 2019, we've been pleased with the response from growers who have made commitments going forward. We've seen some good results in the mill and are pleased to be able to offer growers ample opportunities to make a quality premium, even at a low protein. Our contracts are for either full spec 13% with fallbacks down to 12% or min 11.5% protein with fallbacks to 11%."

George Mason
Senior Grain Buyer
at Heygates Milling



KWS PALLADIUM

NEW

Details

Group	Year Listed	UK treated yield	Parentage
2	2022	100%	KWS Zyatt x KWS Trinity

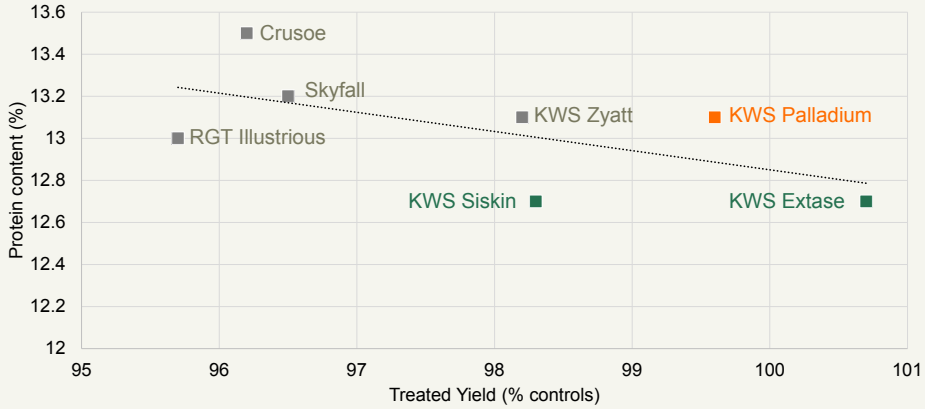
Comments

KWS Palladium is the new and exciting addition to the UK domestic bread markets. It is a super clean variety with one of the highest untreated yields on the market today, thanks to its scores for *Septoria* (7.4), mildew (8), yellow rust (9) and eyespot ([6]). Importantly, its *Septoria* resistance has a different genetic basis than other commercialised Group 2 varieties.

This early to mature variety (-1) is short and stiff with great resistance to sprouting, giving growers security at harvest. In addition, KWS Palladium has good yield potential across all the regions and performs well in both the first (99%) and second wheat (100%) slots.

Suited to earlier drilling than KWS Extase, KWS Palladium and Extase make good on farm partners for growers targeting the Group 2 market sector or adding quality grain to the feed heap. And for those looking to harness full milling premiums, KWS Palladium is the obvious choice of the Group 2s, offering a greater chance of hitting 13% milling protein thanks to its ability to efficiently scavenge nitrogen and turn that into marketable protein.

KWS Palladium – the Group 2 with greater potential of hitting a 13% protein specification



Data Source: AHDB Recommended List 2022/23

KWS SISKIN

Details

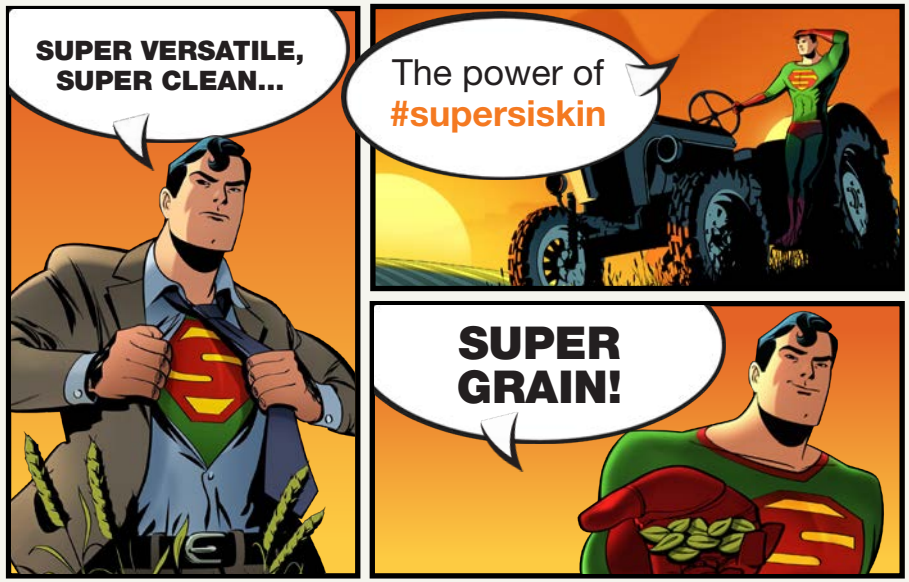
Group	Year Listed	UK treated yield	Parentage
2	2016	98%	KWS Sterling x Timaru

Comments

KWS Siskin is one of the most adapted varieties for use in modern farming. With an ultra-wide sowing window, it is the ideal variety for enabling competitive winter cropping and countering black-grass. An impressively strong disease profile and a grain that is widely accepted by end-users at all protein levels, KWS Siskin is a versatile variety that fits a range of situations and fills many requirements.

A strong yielder across all regions and a consistent performer across the seasons, it is popular as a quality wheat and as a feed. A specific weight of 76.7 kg/hl, a HFN of 282 seconds and a milling specification protein of 12.7% make it an attractive variety for domestic and export markets where the UKP brand is recognised.

Another variety with a strong disease resistance profile, it has an untreated yield of 83% of treated controls due in large part to strong *Septoria tritici* and yellow rust resistance for which it scores a 6.5 and a 9 respectively. Importantly, KWS Siskin is one of the few varieties on the current RL to have juvenile plant resistance to yellow rust. Its vigorous growth habit makes it well-suited to later drilling while still offering medium maturity.



Varieties featuring the Cereals360 logo can be viewed on the KWS Virtual World **www.cereals360.co.uk**

Group 3

This Group contains soft varieties for biscuit, cake and other flours where the main requirement is for soft milling characteristics. Group 3 wheats are unique to the UK, they have inherently lower protein with good extraction rates and good extensibility but not too elastic gluten. At the right specification, UK Group 3s ensure that the nation's biscuits are not too chewy, stay the right shape during baking and that the right number of biscuits are produced for each packet. These varieties are uniquely grown in the UK environment and are desired by continental millers for use in biscuit and flatbread production; hence many Group 3 wheats have the UKS brand for export.

SPECIFICATION (UK Flour Millers)

	Group 3 Specs	UKS Specs
Protein	11.5%	10.5% - 11.5%
HFN	220	220
Specific weight (kg/hl)	74.0	75.0
Max. moisture content (%)	15%	14%
Max. admix	2%	2%
W	-	70 - 120
P/L	-	Max. 0.55

In addition, thanks to the lower protein and higher starch ratio of these softer milling types, many Group 3s also have opportunities in the wheat distilling sector.

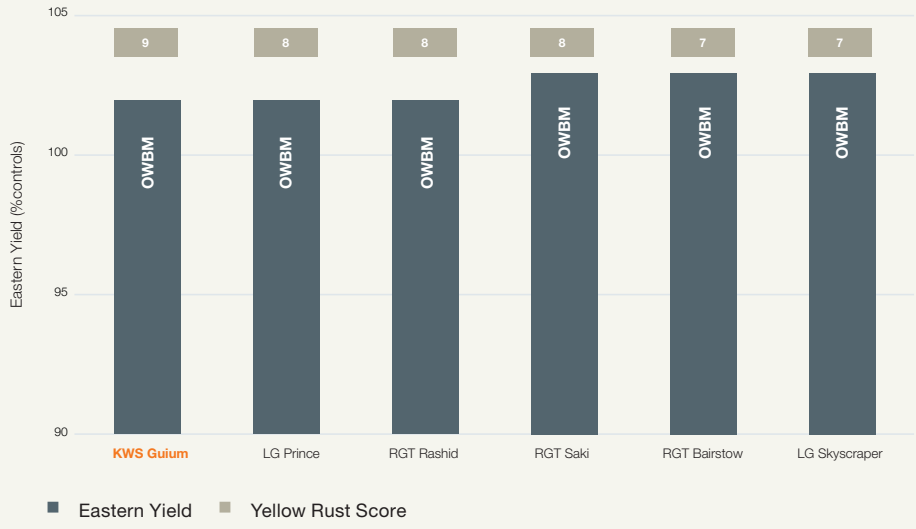
KWS GUIUM

AHDB RECOMMENDED

NEW

Details		Comments
Group	3	KWS Guium is the perfect wheat to schedule on farm this year. Suited to being drilled from October onwards, KWS Guium is later maturing (+3) which enables the spreading of the workload at harvest. The excellent sprouting resistance also adds flexibility during this time. With good yellow rust resistance (9) and OWBM, the variety performs well in the East. Whilst a robust fungicide programme is recommended to get the best out of this variety. KWS Guium is one of the few varieties not to be based on Cougar, and as such, it is a useful addition on farm to increase genetic diversity into the wheat rotation.
Year Listed	2022	
Treated Yield	102%	
Parentage	KWS Rowan x Tempo	

Adding excellent yellow rust resistance and OWBM to the high yielding soft milling and feed sectors



KWS BRIUM

NEW

Details

Group	Year Listed	UK treated yield	Parentage
3	2022	100%	KWS Solo x KWS Basset

Comments

- Excellent grain quality, perfect for biscuit making and distilling
- Good disease package including yellow rust (9), mildew (7), Fusarium (6) and eyespot (6) resistances
- Excellent yields later sown, 1st and 2nd and in the East and North

KWS Brium is an attractive Group 3 winter wheat for many end-users. With its great quality grain, high input and high output status KWS Brium has good potential for both distillers and professional biscuit producers alike.

With good high yielding performance in the UK, KWS Brium may be the perfect choice for your farm, especially in the North and South.

KWS Brium - Why a farmer will grow it

Distilling
- Scottish homes and English maltsters
- Typical intake 15% moisture ≥72 kg/hl specific weight and less than 2% nitrogen

Soft Milling
- Typical intake 15% moisture ≥ 74 kg/hl specific weight, max 11.5% protein and 180 HFN

Soft feed, starch plants and bioethanol
- Homes across the UK
- Typical intake 15% moisture ≥ 72 kg/hl specific weight

KWS FIREFLY

Details

Group	Year Listed	UK treated yield	Parentage
3	2019	100%	Cougar x KWS Rowan

Comments

If you are looking for a variety to help scheduling on farm, then KWS Firefly is a great option. It's a high tillering, very stiff type with early maturity and will work well for those drilling in September to those on heavy land in both first and second wheat slots. Fully approved by the UK Flour Millers as a soft Group 3, Firefly's biscuit credentials have been tried and tested by UK and export biscuit manufacturers alike. Add this to the good yield potential in the East, where over 70% of the UK's biscuit wheats are grown, and you have a wheat that will harness added value opportunities in this region. Disease resistances are generally good, but as Cougar derivative, *Septoria* control using later drillings and appropriate chemistry will be a priority for growers.

KWS BARREL

Details

Group	Year Listed	UK treated yield	Parentage
3	2016	99%	Bantam x Viscount

Comments

With good yield performances across the north, KWS Barrel has been firmly established on farm since 2016. The variety is UKS approved for export and is fully approved for biscuit production as a UK FM Group 3 and has a specific weight of 76.9 kg/h and a HFN of 240 seconds and a protein of 11.2%. KWS Barrel has a reasonable disease package, including a 6 for yellow rust and mildew; *Septoria* at a 4.3 will need attention. Growers who know it well say that its best performances are on light land and also in the second cereal slot, where year on year it continues to deliver good yields.

Winter Wheat Recommended List 2022/23, Groups 1, 2 & 3

Page 1

	KWS Zyatt	Skyfall	Crusoe	RGT Illustrious	KWS Extase	KWS Palladium	KWS Siskin	Mayflower	KWS Guium	LG Prince	KWS Brium	KWS Firefly	RGT Rashid	LG Illuminate	LG Astronomer	Merit	KWS Barrel	Elicit
End-use group	UKFM Group 1				UKFM Group 2				UKFM Group 3									
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	E	UK	UK	E	UK	UK
Variety status		C				NEW	C	NEW	NEW		NEW		NEW				*C	
Fungicide-treated grain yield (% treated control)																		
United Kingdom (10.8 t/ha)	98	97	96	96	101	100	98	97	102	101	100	100	100	100	100	99	99	98
East region (10.7 t/ha)	98	97	96	95	100	99	98	98	102	102	101	101	102	100	100	101	99	98
West region (11.0 t/ha)	99	96	97	97	102	101	99	97	100	101	100	100	97	100	99	97	99	98
North region (11.1 t/ha)	98	96	94	94	99	[99]	98	[96]	[101]	99	[101]	99	[97]	101	97	100	102	99
Main market options (The specific attributes of varieties are different, so, whenever possible, varieties should not be mixed in store)																		
UK bread-making	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	-
UK biscuit, cake-making	-	-	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
UK distilling	-	-	-	-	-	-	-	-	[Y]	[Y]	[Y]	-	[Y]	[Y]	[Y]	[Y]	-	Y
ukp bread wheat for export	Y	-	Y	-	Y	-	Y	[Y]	-	-	-	-	-	-	-	-	-	-
uks soft wheat for export	-	-	-	-	-	-	-	-	-	-	-	Y	-	[Y]	-	[Y]	Y	Y
Grain quality																		
Endosperm texture	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Soft	Soft	Soft	Soft	Soft	Soft	Soft	Soft	Soft	Soft
Protein content (%)	12.2	12.2	12.7	12.2	11.9	11.8	11.9	11.9	11.3	11.1	11.5	11.7	11.1	11.8	11.7	11.5	11.2	11.5
Protein content (%) - Milling spec	13.1	13.2	13.5	13.0	12.7	[13.1]	12.7	[12.9]	[12.0]	11.9	[12.3]	12.6	[11.8]	12.7	12.6	12.4	12.0	12.4
Hagberg Falling Number	260	273	274	270	289	315	282	294	255	253	268	240	226	249	232	258	240	208
Specific weight (kg/hl)	77.5	78.3	77.8	77.1	78.5	76.9	76.7	78.5	78.1	74.0	77.3	75.3	76.4	76.2	77.4	76.2	76.9	76.4
Chopin Alveograph W	[175]	[251]	230	-	190	[179]	163	198	[56]	[71]	[74]	90	[72]	82	[132]	79	102	91
Chopin Alveograph P/L	[0.7]	[0.9]	0.6	-	0.6	[0.6]	0.5	0.7	[0.3]	[0.2]	[0.3]	0.3	[0.3]	0.3	[0.4]	0.2	0.3	0.2
Untreated grain yield (% treated control)																		
United Kingdom (10.8 t/ha)	76	70	72	81	93	90	83	90	78	83	80	79	79	84	86	81	73	78
Agronomic features																		
Resistance to lodging without PGR (1-9)	8	8	8	7	7	7	6	6	7	7	7	8	8	7	7	6	8	6
Resistance to lodging with PGR (1-9)	8	8	7	8	8	8	7	7	7	8	7	8	8	7	9	7	8	7
Height without PGR (cm)	85	84	82	89	90	84	84	89	90	83	92	83	86	83	88	88	84	86
Ripening (days +/- Skyfall, -ve = earlier)	0	0	+1	+1	-1	-1	0	0	+3	+2	+2	+1	+3	+1	+1	+1	+1	+1
Resistance to sprouting (1-9)	5	5	6	6	[7]	-	5	-	-	[6]	-	[6]	-	[7]	[7]	[6]	6	5
Disease resistance																		
Mildew (1-9)	7	6	7	7	7	8	8	8	5	4	7	5	4	5	4	4	6	6
Yellow rust (1-9)	4	3	9	8	8	9	9	9	9	8	9	6	8	7	8	8	6	8
Brown rust (1-9)	6	8	3	6	7	5	5	6	3	7	5	5	6	7	8	7	5	6

Winter Wheat Recommended List 2022/23, Groups 1, 2 & 3

Page 2

	KWS Zyatt	Skyfall	Crusoe	RGT Illustrious	KWS Extase	KWS Palladium	KWS Siskin	Mayflower	KWS Guium	LG Prince	KWS Brium	KWS Firefly	RGT Rashid	LG Illuminate	LG Astronomer	Merit	KWS Barrel	Elicit
End-use group	UKFM Group 1				UKFM Group 2				UKFM Group 3									
Disease resistance (continued)																		
Septoria tritici (1-9)	6.1	5.3	6.2	5.7	7.8	7.4	6.5	8.4	4.7	6.4	5.4	5.7	6.9	6.1	6.8	5.8	4.3	4.9
Septoria tritici (1-9) - one-year rating	5.8	5.1	5.9	5.4	7.3	7.2	6.5	8.2	5.0	5.8	5.6	4.9	6.4	5.4	6.2	5.2	4.4	5.2
Eyespot (1-9)	6@	7@	5	7@	3	[6]	4	[6]@	[4]	5	[6]	3	[4]	5	5	3	4	3
Fusarium ear blight (1-9)	6	7	7	6	6	6	6	6	7	6	6	5	7	5	6	6	6	6
Orange wheat blossom midge	-	R	-	-	-	-	-	-	R	R	-	R	R	R	R	R	R	R
Breeder/UK contact																		
Breeder	KWS	RAGT	Lim	R2n	Mom	KWS	KWS	ElsW	KWS	LimEur	KWS	KWS	RAGT	LimEur	LimEur	ElsW	KWS	ElsW
UK contact	KWS	RAGT	Lim	RAGT	KWS	KWS	KWS	Els	KWS	Lim	KWS	KWS	RAGT	Lim	Lim	Els	KWS	Els
Annual treated yield (% control)																		
2017 (11.2 t/ha)	100	97	95	96	99	-	98	-	-	-	-	100	-	-	-	-	101	98
2018 (10.7 t/ha)	98	97	95	96	101	-	100	-	-	100	-	101	-	100	99	100	99	98
2019 (11.6 t/ha)	96	95	98	94	100	100	99	98	100	101	100	101	98	101	100	100	101	99
2020 (10.3 t/ha)	97	96	95	97	100	[100]	97	[96]	[103]	102	[102]	100	[100]	101	99	100	101	98
2021 (10.8 t/ha)	100	97	96	94	103	99	97	96	100	99	100	98	98	98	98	98	100	97
Rotational position																		
First cereal (11.1 t/ha)	98	96	96	96	101	100	98	97	101	100	100	100	100	100	99	99	100	98
Second and more (9.6 t/ha)	99	98	94	94	101	100	98	99	101	103	101	101	100	100	100	100	98	98
Sowing date (most trials were sown in October)																		
Early sown (before 25 Sept) (11.3 t/ha)	[100]	96	96	97	[[97]]	-	99	-	[103]	102	[101]	101	-	104	[103]	[100]	100	99
Late sown (after 1 Nov) (9.2 t/ha)	98	97	95	95	102	[99]	98	[95]	[101]	101	[101]	101	[103]	98	100	102	100	97
Soil type (about 50% of trials are on medium soils)																		
Light soils (10.9 t/ha)	97	97	94	94	102	[98]	98	[97]	[101]	102	[100]	100	[99]	101	100	101	100	98
Heavy soils (10.9 t/ha)	99	97	97	96	100	98	98	97	102	101	99	101	100	100	101	100	99	97
Agronomic features																		
Lodging % without PGR	2	1	2	3	4	4	13	8	3	5	3	1	2	4	3	13	2	10
Lodging % with PGR	1	3	3	1	2	2	8	6	4	3	5	1	2	5	1	8	3	4
Latest safe-sowing date	End Jan	End Feb	End Jan	Mid Feb	End Jan	[[Mid Feb]]	End Jan	[[Mid Feb]]	[[Mid Feb]]	[End Jan]	[[End Feb]]	End Feb	[[Mid Feb]]	[Mid Feb]	[Mid Feb]	[Mid Feb]	End Jan	Mid Feb
Speed of development to growth stage 31 (days +/- average)																		
Early sown (Sept)	-2	-2		0	-4	[-2]	-3	[-4]	[+2]	[-2]	[+2]	-2	[+2]	[-2]	[-8]	[0]	+5	
Med sown (Oct)	-4	-4	-2	+1	-7	-	-5	-	-	[-1]	-	-3	-	[-3]	[0]	[-6]		+2
Late sown (Nov)	-2	-2	0		-4	-	-2	-	[0]	[+1]	-		-	[-2]	[+1]	[-1]	+2	+2
Status in RL system																		
Year first listed	17	14	12	16	19	22	16	22	22	21	22	19	22	21	21	21	16	18
RL status	-	-	-	-	-	P1	-	P1	P1	P2	P1	-	P1	P2	P2	P2	*	-

Varieties featuring the Cereals360 logo can be viewed on the KWS Virtual World **www.cereals360.co.uk**

Soft Group 4

These are feed varieties that may or may not have additional end-use opportunities – some have tested positive for distilling whilst others may be suitable for soft milling applications on the continental market. It is always worth checking with your local merchant to fully understand the specification your end-user customer requires.

Soft Group 4 Varieties

KWS JACKAL

AHDB RECOMMENDED

Details		Comments
Group	4 Soft	KWS Jackal is the soft wheat of choice for those who favour early drilling. It performs impressively wherever sown but excels in the North and East regions where it will be closest to end-user demand. Not only that, but its SWRI approval supports its appeal to those supplying distilling contacts. In addition to this, it makes a good partner variety to KWS Barrel. It performs strongly as both a first and second cereal and on light and heavy soils. Its disease resistance is average with an exceptional score for yellow rust of 8, but low scores for *Septoria tritici* of 4.6, which will need watching. KWS Jackal carries orange wheat blossom midge (OWBM) resistance.
Year Listed	2018	
UK treated yield	99%	
Parentage	KWS Santiago x KWS W177	

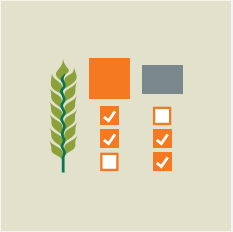
Unsure of which wheat variety is right for you and your farm?

my KWS

Time to take advantage of seasonal recommendations.

Receive information and recommendations from your regional consultants based on the current season and your preferred crop types.

Use our myKWS tools to help make the best decisions for your farm:



Winter Wheat Variety Comparitor

- This tool allows you to compare KWS varieties against those on the AHDB Recommended List.
- Compare up to five different varieties at once!

Seed Rate Calculator

- Calculate your sowing strength quickly and easily with use of this handy calculator.
- Also available for other crops.

Sign up to myKWS to try the tools now.

Visit **www.kws-uk.com/mykws** or scan the QR code

Winter Wheat Recommended List 2022/23, Soft Group 4

Page 1

	RGT Bairstow	LG Skyscraper	RGT Saki	RGT Stokes	LG Spotlight	Elation	KWS Jackal	Swallow
End-use group	Soft Group 4							
Scope of recommendation	UK	UK	UK	UK	UK	N	N	N
Variety status	NEW	C		NEW	*			
Fungicide-treated grain yield (% treated control)								
United Kingdom (10.8 t/ha)	103	103	103	102	102	100	99	99
East region (10.7 t/ha)	103	103	103	101	101	100	99	98
West region (11.0 t/ha)	103	103	103	105	103	100	98	99
North region (11.1 t/ha)	[103]	102	102	[104]	101	101	100	101
Main market options (The specific attributes of varieties are different, so, whenever possible, varieties should not be mixed in store)								
UK bread-making	-	-	-	-	-	-	-	-
UK biscuit, cake-making	-	-	-	-	-	-	-	-
UK distilling	Y	[Y]	-	Y	[Y]	Y	[Y]	Y
ukp bread wheat for export	-	-	-	-	-	-	-	-
uks soft wheat for export	-	-	-	-	-	Y	-	-
Grain quality								
Endosperm texture	Soft	Soft	Soft	Soft	Soft	Soft	Soft	Soft
Protein content (%)	11.2	11.3	11.4	11.3	11.3	11.5	11.1	11.2
Protein content (%) - Milling spec	[12.2]	12.2	12.2	[12.5]	12.1	12.4	12.0	12.3
Hagberg Falling Number	228	214	220	248	286	212	179	249
Specific weight (kg/hl)	75.9	76.5	75.6	75.3	77.7	76.9	74.8	75.8
Chopin Alveograph W	[50]	-	-	[61]	-	95	-	-
Chopin Alveograph P/L	[0.3]	-	-	[0.3]	-	0.2	-	-
Untreated grain yield (% treated control)								
United Kingdom (10.8 t/ha)	85	82	85	83	77	77	74	79
Agronomic features								
Resistance to lodging without PGR (1-9)	6	6	6	5	7	7	7	[8]
Resistance to lodging with PGR (1-9)	6	6	7	7	8	8	6	9
Height without PGR (cm)	91	92	88	91	93	83	87	80
Ripening (days +/- Skyfall, -ve = earlier)	+2	0	+3	+2	+1	+1	+1	+1
Resistance to sprouting (1-9)	-	[5]	[6]	-	[7]	5	5	[5]
Disease resistance								
Mildew (1-9)	6	7	5	5	6	7	7	6
Yellow rust (1-9)	7	7	8	7	5	8	8	6
Brown rust (1-9)	6	5	7	5	6	5	5	6

Winter Wheat Recommended List 2022/23, Soft Group 4

Page 2

	RGT Bairstow	LG Skyscraper	RGT Saki	RGT Stokes	LG Spotlight	Elation	KWS Jackal	Swallow
End-use group	Soft Group 4							
Disease resistance (continued)								
Septoria tritici (1-9)	6.4	4.9	5.9	6.9	5.1	4.0	4.6	5.5
Septoria tritici (1-9) - one-year rating	6.0	4.6	5.1	6.2	4.9	3.9	4.6	4.9
Eyespot (1-9)	[4]	4	4	[4]	5	4	4	2
Fusarium ear blight (1-9)	6	6	6	6	6	6	6	5
Orange wheat blossom midge	R	R	R	-	R	R	R	R
Breeder/UK contact								
Breeder	RAGT	LimEur	RAGT	RAGT	LimEur	ElsW	KWS	BA
UK contact	RAGT	Lim	RAGT	RAGT	Lim	Els	KWS	Sen
Annual treated yield (% control)								
2017 (11.2 t/ha)	-	103	102	-	103	100	100	-
2018 (10.7 t/ha)	-	102	102	-	100	100	100	100
2019 (11.6 t/ha)	103	103	103	104	102	99	100	99
2020 (10.3 t/ha)	[104]	103	104	[102]	103	101	100	101
2021 (10.8 t/ha)	102	102	102	104	103	101	97	98
Rotational position								
First cereal (11.1 t/ha)	103	103	103	103	102	100	99	99
Second and more (9.6 t/ha)	104	104	103	103	101	102	100	100
Sowing date (most trials were sown in October)								
Early sown (before 25 Sept) (11.3 t/ha)	-	103	104	-	101	100	101	101
Late sown (after 1 Nov) (9.2 t/ha)	[104]	103	104	[100]	102	101	100	97
Soil type (about 50% of trials are on medium soils)								
Light soils (10.9 t/ha)	[104]	103	102	[104]	101	101	99	101
Heavy soils (10.9 t/ha)	104	103	102	102	102	100	100	98
Agronomic features								
Lodging % without PGR	12	9	9	30	4	3	6	1
Lodging % with PGR	10	13	4	8	2	3	10	1
Latest safe-sowing date	[[Mid Feb]]	End Jan	End Jan	[[End Jan]]	End Feb	Mid Feb	End Jan	[End Feb]
Speed of development to growth stage 31 (days +/- average)								
Early sown (Sept)	[+3]	-4	+7	[+2]	-2	+0	+4	[+5]
Med sown (Oct)	-		[-2]	-	-3		+3	[+2]
Late sown (Nov)	-	-3	0	-			+1	[+3]
Status in RL system								
Year first listed	22	19	20	22	19	18	18	21
RL status	P1	-	-	P1	*	-	-	P2

Varieties featuring the Cereals360 logo can be viewed on the KWS Virtual World **www.cereals360.co.uk**

Hard Group 4

UK FLOUR MILLERS

Grown mainly as feed wheats but some may be used by millers in general-purpose grists if they achieve contractual standards. Hence it's always a good idea to choose varieties with a robust grain package for protein, HFN and specific weight. It is also worth checking with your local merchant to fully understand the specification your end-user customer requires. Growers should take care and avoid mixing hard and soft types in store.

KWS DAWSUM

AHDB RECOMMENDED

NEW

Details

Group	Year Listed	UK treated yield	Parentage
4 Hard	2022	104%	KWS Kerrin x Costello

Comments

- Exceptional specific weight (79.4 kg/hl)
- Very high yield potential across all regions of the UK
- Super flexible on farm with a wide sowing window

Awesome Dawsum! The bankable barn filler – a hard feed type that offers great yields with exceptional specific weight (79.4kg/hl). It's a really clean, nice plant type with one of the widest sowing windows available.

This is a variety that will be in demand. We had a small seed pre-release drilling 2021 and now the variety will be fully available for sowing 2022 to allow growers to take advantage of healthy grain prices and plant a real barn-buster this autumn.

During its years of development, KWS Dawsum has delivered exceptional yields in both the early and late sown slots - this makes it a really flexible all-round variety, the likes of which we have seen in the past from wheats like KWS Santiago. In short, it will deliver whenever you plan to drill but has the flexibility to deliver if the weather changes your plans.

KWS Dawsum has a great disease package for such a high yielding barn filler with excellent untreated yields and good scores against all the main yield-robbing diseases, this will be key to allowing growers some flexibility over spray timings when workloads are at their peak in the spring.

A short to mid-length strawed variety, KWS Dawsum is very stiff, offering security of maintaining yield through to harvest where it will produce big heaps of highly marketable grain, thanks to the strong specific weight, good HFN, and protein.

Awesome KWS Dawsum in a nutshell:

A truly **special combination** of yield, grain quality and disease resistance

	UK Yield (% controls)	HFN	Specific weight (kg/hl)
KWS Dawsum	**104**	**304**	**79.4**
Champion	106	239	74.8
SY Insitor	104	270	78.2
Gleam	103	220	76.3
Graham	102	275	76.9
Costello	**100**	**322**	**80.6**
RGT Bairstow	103	228	75.9
LG Skyscraper	103	214	76.5

"I think farmers are going to love it – bushel weight is a massive plus. In Frontier trials in 2020, Dawsum produced 106% yield - higher than any other candidate or current RL variety. It has a similar growth habit to Costello, so suits early drilling in the West and North. It also performs well in late sown trials and is higher tillering than KWS Kerrin. As well as this, it is extremely stiff and has a strong disease package. Definitely, a variety that should capture the attention of UK farmers wanting to fill up the barn."

Jim Knight
Frontier Seed Development Manager

KWS CRANIUM

AHDB RECOMMENDED

360

Details

Group	Year Listed	UK treated yield	Parentage
4 Hard	2021	102%	KWS Crispin x KWS Kielder

Comments

KWS Cranium, the thinking farmer's wheat!

Added to the 2021/22 RL, KWS Cranium is a unique wheat that is set to earn itself the reputation as the go-to risk management tool for UK growers. It offers an excellent combination of yellow rust resistance (8), OWBM resistance and stem stiffness available in the feed sector today. It's because of this that Cranium will earn itself a place on most farms this autumn.

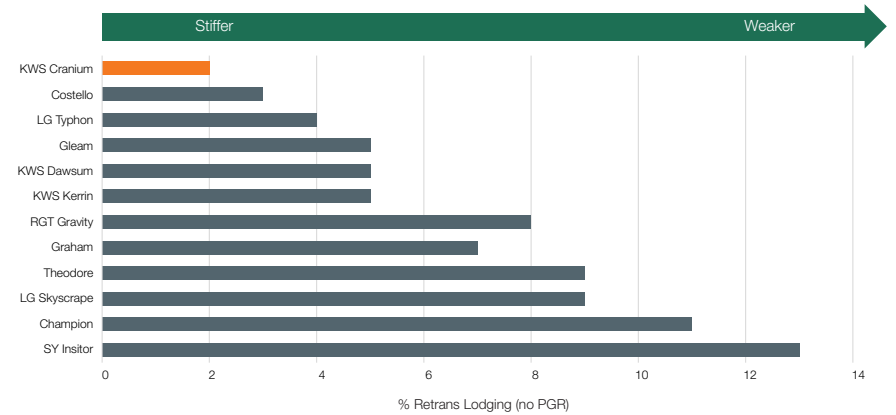
A mainstream sower, KWS Cranium sits at the top of the hard feed pack in terms of yield performance. It retains its yield potential as a second wheat and, thanks to its vigorous growth habit, really shines in later drillings ([104%]). KWS Cranium is a variety that wants to maximise its yield, it has the vigour and stiffness that keep it going right through to harvest.

It has a strong disease package, especially against the more important disease of *Septoria* (5.7) and yellow rust (8). A solid score for *Septoria* significantly reduces the risk of the disease and can add flexibility to fungicide planning. KWS Cranium's value in the fight against yellow rust is clear: it adds seedling resistance to the high yielding hard Group 4 sector and retains this high level of resistance through to the adult plant stage. With mildew at a 6 and brown rust a 4, both need watching but should be well controlled with a standard farm programme.

KWS Cranium is the stiffest feed on the market today, hence reducing the potential for lodging and yield loss.

Data source: WW trials harvest 2020, AHDB

KWS Cranium has excellent straw stiffness



Data Source: AHDB Recommended List 2022/23

Winter Wheat Recommended List 2022/23, Hard Group 4

Page 1

	Champion	KWS Dawsum	SY Insitor	Gleam	KWS Kerrin	LG Typhoon	KWS Cranium	Graham	RGT Gravity	Costello	RGT Wolverine	Theodore
End-use group	Hard Group 4											
Scope of recommendation	UK	UK	UK	UK	E&W	UK	UK	UK	UK	UK	Sp	W
Variety status	NEW	NEW		C	*	NEW			*			
Fungicide-treated grain yield (% treated control)												
United Kingdom (10.8 t/ha)	106	104	104	103	102	102	102	102	101	100	99	98
East region (10.7 t/ha)	107	103	104	103	102	102	102	100	102	99	98	98
West region (11.0 t/ha)	105	106	104	103	103	102	101	104	101	100	100	101
North region (11.1 t/ha)	[103]	[106]	105	103	[101]	[102]	101	102	100	100	100	[91]
Main market options (The specific attributes of varieties are different, so, whenever possible, varieties should not be mixed in store)												
UK bread-making	-	-	-	-	-	-	-	-	-	-	-	-
UK biscuit, cake-making	-	-	-	-	-	-	-	-	-	-	-	-
UK distilling	-	-	-	-	-	-	-	-	-	-	-	-
ukp bread wheat for export	-	-	-	-	-	-	-	-	-	-	-	-
uks soft wheat for export	-	-	-	-	-	-	-	-	-	-	-	-
Grain quality												
Endosperm texture	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard
Protein content (%)	11.4	11.2	10.8	11.2	10.7	11.1	11.2	11.3	11.3	11.8	11.0	12.0
Protein content (%) - Milling spec	[12.4]	[12.1]	11.5	12.0	11.4	[11.8]	12.0	11.9	12.0	12.7	11.8	12.9
Hagberg Falling Number	239	304	270	220	149	169	279	275	193	322	268	306
Specific weight (kg/hl)	74.8	79.4	78.2	76.3	76.1	76.3	75.1	76.9	75.6	80.6	75.5	73.8
Chopin Alveograph W	-	-	-	-	-	-	-	-	-	-	[147]	-
Chopin Alveograph P/L	-	-	-	-	-	-	-	-	-	-	[0.7]	-
Untreated grain yield (% treated control)												
United Kingdom (10.8 t/ha)	90	92	78	80	73	89	79	88	77	81	69	88
Agronomic features												
Resistance to lodging without PGR (1-9)	6	7	6	7	7	7	8	7	6	8	7	[6]
Resistance to lodging with PGR (1-9	7	7	7	7	7	7	8	8	7	8	7	8
Height without PGR (cm)	88	84	95	87	88	88	89	88	89	83	87	84
Ripening (days +/- Skyfall, -ve = earlier)	0	+1	+1	0	+1	+2	+3	-1	+1	+2	+2	0
Resistance to sprouting (1-9)	-	-	[5]	5	5	-	[6]	7	5	6	[6]	[7]
Disease resistance												
Mildew (1-9)	7	8	6	6	7	7	6	7	5	8	6	[7]
Yellow rust (1-9)	8	9	5	5	4	9	8	7	6	9	4	9
Brown rust (1-9)	5	7	5	6	7	6	4	5	6	5	8	8

Winter Wheat Recommended List 2022/23, Hard Group 4

Page 2

	Champion	KWS Dawsum	SY Insitor	Gleam	KWS Kerrin	LG Typhoon	KWS Cranium	Graham	RGT Gravity	Costello	RGT Wolverine	Theodore
End-use group	Hard Group 4											
Disease resistance (continued)												
Septoria tritici (1-9)	7.7	6.3	6.5	5.8	4.6	7.2	5.9	6.7	4.7	5.8	5.7	8.5
Septoria tritici (1-9) - one-year rating	8.0	6.1	6.1	5.5	4.9	6.9	5.7	6.4	4.6	5.6	5.7	9.0
Eyespot (1-9)	[4]	[5]	4	4	4	[6]	5	3	4	4	6	[4]
Fusarium ear blight (1-9)	6	6	7	6	5	6	6	7	6	6	6	5
Orange wheat blossom midge	R	-	R	R	R	R	R	-	R	-	-	-
Breeder/UK contact												
Breeder	DSV	KWS	SyP	SyP	KWS	LimEur	KWS	SyP	R2n	KWS	R2n	DSV
UK contact	DSV	KWS	Syn	Syn	KWS	Lim	KWS	Syn	RAGT	Sen	RAGT	DSV
Annual treated yield (% control)												
2017 (11.2 t/ha)	-	-	103	102	101	-	-	102	102	100	-	96
2018 (10.7 t/ha)	-	-	103	103	102	-	102	101	100	100	100	97
2019 (11.6 t/ha)	104	104	105	103	102	102	101	102	101	99	101	97
2020 (10.3 t/ha)	[105]	[106]	103	103	102	[102]	103	102	102	100	101	[96]
2021 (10.8 t/ha)	106	105	106	105	103	102	100	104	101	100	96	97
Rotational position												
First cereal (11.1 t/ha)	105	105	104	103	102	101	102	102	101	100	99	98
Second and more (9.6 t/ha)	107	104	104	103	102	104	102	101	103	99	99	[100]
Sowing date (most trials were sown in October)												
Early sown (before 25 Sept) (11.3 t/ha)	[106]	[108]	[[107]]	103	[[102]]	[105]	[[102]]	100	100	99	[100]	97
Late sown (after 1 Nov) (9.2 t/ha)	[106]	[104]	104	103	103	[101]	104	100	103	102	99	[99]
Soil type (about 50% of trials are on medium soils)												
Light soils (10.9 t/ha)	[105]	[105]	106	103	102	[102]	103	102	102	99	97	[[97]]
Heavy soils (10.9 t/ha)	106	104	104	103	101	101	100	101	101	99	99	99
Agronomic features												
Lodging % without PGR	11	5	13	5	5	4	2	7	8	3	5	9
Lodging % with PGR	8	3	5	5	8	5	3	2	8	2	5	2
Latest safe-sowing date	[[Mid Feb]]	[[End Jan]]	End Jan	Mid Feb	End Jan	[[Mid Feb]]	[Mid Feb]	End Jan	End Jan	End Jan	[End Jan]	End Jan
Speed of development to growth stage 31 (days +/- average)												
Early sown (Sept)	[-2]	[0]	+2	+6	+1	[+5]	[-3]	+1	+4	-2	[-3]	
Med sown (Oct)	-	-	[-2]	+3	0	-	[-3]	0	+2	-2	[0]	[-3]
Late sown (Nov)	[-5]	[+3]	+2	+2	0	-	[-4]	-3		-2	[0]	
Status in RL system												
Year first listed	22	22	20	18	17	22	21	16	18	15	21	20
RL status	P1	P1	-	-	*	P1	P2	-	*	-	P2	-

KWS KERRIN

AHDB RECOMMENDED

Details		Comments
Group	4 Hard	A solid and reliable variety across the East and North regions, both heavy and light land sites and across contrasting years, KWS Kerrin was the stand-out performer in harvest 2018 being one of only two varieties to yield in line with its long-term average. A specific weight of 76.1 kg/hl, a HFN of 149 seconds and a protein of 10.7%. It is a KWS Santiago cross and, like its parent, is resistant to orange wheat blossom midge (OWBM) and performs consistently over sites and seasons.
Year Listed	2017	
UK Treated Yield	102%	
Parentage	KWS Santiago x KWS W177	

KWS PARKIN

Details			
Group	Year Listed	UK treated yield	Parentage
4 Hard	Not added to RL	102%	Reflection x Costello

Comments

Falling just short of making it onto the 2020/2021 Recommended List, our latest wheat addition could be overlooked by some – but this small and mighty variety could offer growers something truly unique this autumn.

With the wet weather in both autumn 2019 and 2020 still at the front of many minds, a variety suited to early drilling could be top on many UK farmers' wish lists, and for those looking to get off the mark quickly, then KWS Parkin is the ideal choice. It can be drilled across a range of soil types although its best yield performances may come from heavier soils. And from our own trials, we've seen that it is highly suitable for both first and second wheat positions.

To get the best out of KWS Parkin, growers should consider drilling this variety before the 25th of September. In AHDB and KWS trials, it was in this relatively early slot that the true yield potential of KW Parkin was realised and the variety significantly outperformed well-known barn fillers.

Parkin's other stand out feature is its height, at 78.6cm, it's an impressive 15cm shorter than the tallest variety on the RL and super stiff too. Since the demise of Grafton and Cordiale, over the last 5-10 years or so we've really seen a gap in the market for this type of variety. Today farmers are looking for agronomic tools like KWS Parkin that are short and stiff enabling PGR applications to be simplified and introducing flexibility into spray windows, allowing them to be safely widened to when workloads or weather conditions permit. It's the obvious choice for growers in the East and Yorkshire on more fertile soils and those that use manures and digestate.

Harvest 2022 Winter Wheat Candidates

KWS ULTIMATUM

AHDB CANDIDATE

Details			
Group	Year Listed	UK Treated Yield	Parentage
Potential Group 2	Candidate	101%	KWS Zyatt x Costello

Comments

With fantastic untreated yields (90%) akin to industry gold standard KWS Extase (93%), KWS Ultimatum delivers yield performance to the breadmaking sector. This untreated performance is thanks to high disease scores for mildew (7), better combination of yellow rust (7) and brown rust (6) than current Group2s and excellent eyespot ([7]).

On the farm, this new variety offers yield performance across the regions, especially in the west and north whilst being short and very stiff strawed to deliver security at harvest. In the mill and the bakery, KWS Ultimatum delivers good grain with a high specific weight (78.8 kg/hl), even in the most challenging seasons such as harvest 2021. It is currently under evaluation by the UK Flour Millers as a potential Group 2 variety and has export potential with a positive rating to date for UKP.

KWS WRENUM (KWS W400)

AHDB CANDIDATE

Details			
Group	Year Listed	UK Treated Yield	Parentage
Potential Group 2	Candidate	100%	KWS W295 x KWS Siskin

Comments

KWS Wrenum is an excellent potential Group 2 winter wheat for both the domestic and export breadmaking sectors. In the bakery, it has great commercial potential with good grain quality and similar loaf properties, such as volume and colour, to Skyfall. Whilst in the field it offers growers a good disease package and harvest security.

KWS Wrenum has good untreated yield potential (87%) treated controls thanks to its good scores for mildew (7) and solid 6s for yellow rust, brown rust. At a 6 for *Septoria tritici* resistance too, Wrenum also has a different genetic basis for Septoria resistance compared to KWS Extase.

It is a short and stiff winter wheat that has excellent resistance to sprouting, as well as a high HFN helping growers to maximise their grain at harvest even in challenging weather conditions.

KWS WEBBUM (KWS W399)

AHDB CANDIDATE

Details		Comments
Group	4S	KWS Webbum is a high yielding soft Group 4 wheat that has additional market potential from the export and distilling markets. A similar type to other commercialised Soft Group 4s, Webbum has good grain including good HFN (238) and specific weights (77.3kg/hl). A KWS Luther x KWS Kerrin cross, the variety adds non-Cougar based Septoria resistance and OWBM resistance to the soft Group 4 sector. It is a medium straw length but with excellent stem stiffness.
Year Listed	Candidate	
UK Treated Yield	104%	
Parentage	KWS Luther x KWS Kerrin	

KWS ZEALUM (KWS W394)

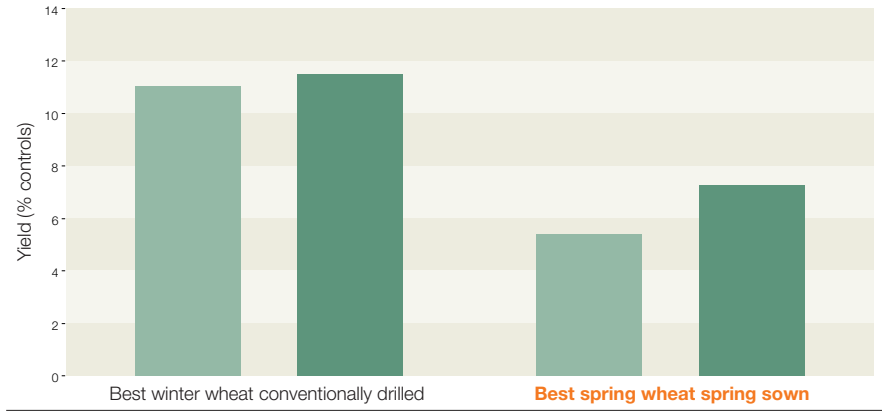
AHDB CANDIDATE

Details		Comments
Group	4S	New for soft wheat growers in the East is KWS Zealum – a high yielding wheat that boasts a good combination of yellow rust resistance, eyespot resistance and OWBM resistance. KWS Zealum is a shorter type with very stiff straw, and thanks to these attributes will perform very well on heavier land. At +1 maturity, KWS Zealum offers mainstream maturity with the added bonus of good resistance to sprouting.
Year Listed	Candidate	
UK Treated Yield	103%	
Parentage	KWS Basset x Reflection	

Introducing the new era in Spring Wheats

Today, on the back of significant plant breeding progression, spring wheat is coming back on the agenda for many UK growers thanks to its rotational benefits. New varieties are robust, flexible and profitable, with yields and physical grain qualities matching many of its late sown winter wheat rivals.

Relative yield increases in winter and spring wheat over that last 20+ years



What can KWS offer growers?

KWS UK is one of the few plant breeding companies with a dedicated spring wheat breeding programme delivering products specifically for the UK farmer. So if you are looking to spring wheats to serve a quality market, to help your rotations in terms of helping buy time to get soils back to better structures, help rescue weed burdens or simplify your crop management then take a closer look at what the KWS spring wheat portfolio can offer.

Today's varieties provide:

- Faster establishment
- Leafier plants with fewer tillers
- High vigour
- Better drought resistance
- Improved disease packages
- Lower lodging risks
- Strong grain fill
- Improved yields
- A range of types to suit different end markets

Learn more about our portfolio by scanning the QR code

Spring Wheat

KWS LADUM

AHDB RECOMMENDED

NEW

Details

Group	Year Listed	UK Treated Yield	Parentage
Group 1	2022	102%	KWS Sywell x KWS Talland

Comments

KWS Ladum is the new spring variety to get excited about this season! It's the first of the next generation spring wheat varieties for the UK market that brings top milling and baking quality with highly productive yield levels, a massive 8% ahead of the market leader Mulika when spring sown. With fantastic grain quality including high proteins (13.2%), Hagberg (324) and a specific weight (78.0 kg/hl), it's a variety that is fully approved by the UK Flour Millers as the highest Group 1 quality.

But the advantages of KWS Ladum don't stop there – it has a good all-round disease package including [8] for mildew, 6 for yellow rust, [7] for brown rust and a good [7] for *Septoria*, as well as being short and stiff strawed and early to harvest [0].

So if you want to take your spring wheat yields to the next level, then take a closer look at KWS Ladum and find out how this new variety can add value to this important part of the rotation on your farm this season.

KWS Ladum - it's a Group 1 but not as we know it!

KWS LADUM baking results

KWS FIXUM

NEW

AHDB RECOMMENDED

Details

Group	Year Listed	UK Treated Yield	Parentage
Group 4	2022	108%	KWS Cochise x KWS Westfield

Comments

New for drilling this spring is KWS Fixum – an exceptionally high yielding spring wheat that resets the yield bar for spring wheats. At 108% of treated controls, Fixum delivers yields 3% ahead of the best of the rest of the spring wheats on the 2023 Recommended List. Not only that, during its testing over the last very different spring seasons, KWS Fixum has delivered consistently high yields no matter the weather conditions under which it has been grown.

Couple this exciting package with good grain quality, including a strong specific weight (77.8kg/hl) and a good disease profile with 8s for mildew and brown rust resistance and you have a really attractive package to add tonnes of grain to the feed wheat heap.

KWS COCHISE

AHDB RECOMMENDED

Details

Group	Year Listed	UK Treated Yield	Parentage
Group 2	2017	104%	Ashby x Lapis

Comments

KWS Cochise is the highest yielding spring breadmaking wheat on the 2022/23 Recommended List. It performs well in both spring-sown where it yields 10% ahead of Mulika and also has the performance to be late autumn-sown where it yields 6% ahead of Mulika.

A high performing spring wheat Cochise has good grain quality including an outstanding specific weight of 78.5kg/hl and a good protein content to serve milling contracts (13.2%).

In the field, the variety is tall but stiff strawed with a good solid disease profile including the added benefits of OWBM resistance and resistance to Soil Borne Wheat Mosaic Virus.

KWS GIRAFFE

AHDB RECOMMENDED

Details

Group	Year Listed	UK Treated Yield	Parentage
Group 2	2020	101%	Recoletta x KWS Kilburn

Comments

Introduced on farm in spring 2020 is KWS Giraffe – the high yielding UK Flour Millers Group 2 wheat with excellent grain quality. A truly dynamic wheat, KWS Giraffe yields well in both spring and autumn-sown slots, delivering yields in the autumn on a par with market leader KWS Cochise and, spring-sown similar to established Group 4 feed spring types such as KWS Kilburn.

It also boasts one of the best grain packages available in this market sector with very high proteins similar to Group 1 Mulika (13.5%) and the best specific weight (79.2 kg/hl) of any spring wheat on the 2023 Recommended List. Giraffe also offers growers security at harvest with a short, stiff straw and early maturity completing its attractive package.

KWS CHILHAM

AHDB RECOMMENDED

Details

Group	Year Listed	UK Treated Yield	Parentage
Group 2	2017	100%	Sparrow x Azurite

Comments

KWS Chilham was the first true dynamic spring wheat, providing growers with sound agronomics, good yield potential and added value market options as a UKFM Group 2 bread maker. It is a vigorous, high yielding variety with a competitive growth habit and will lend itself as a tool to help blackgrass control. In addition, it produces good quality grain with a high Hagberg (336) and a good specific weight (78.2 kg/hl). At a 0 for maturity, it is ideal for growers looking for an earlier harvest time too.

Spring Wheat Recommended List 2022

	KWS Ladum	Nissaba	Mulika	KWS Cochise	KWS Giraffe	KWS Chilham	KWS Fixum	WPB Escape	KWS Talisker	Hexham	KWS Kilburn
End-use group	**UKFM Group 1**			**UKFM Group 2**			**Hard Group 4**				
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK
Variety status	**NEW**	**NEW**	C	C			**NEW**			C	*
UK yield as % control (spring sowing)											
Fungicide-treated (6.8 t/ha)	102	95	94	104	101	100	108	105	104	103	100
UK yield as % control (autumn sowing)											
Fungicide-treated (9.2 t/ha)	-	[97]	95	101	101	99	-	[103]	100	104	[102]
Grain quality (spring sowing)											
Endosperm texture	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard	Hard
Protein content (%)	13.2	13.5	13.6	13.2	13.5	12.9	12.7	12.7	12.5	12.8	13.1
Hagberg Falling Number	324	297	325	243	301	336	218	261	281	274	266
Specific weight (kg/hl)	78.0	76.4	77.0	78.5	79.2	78.2	77.8	76.2	78.7	77.3	75.3
Agronomic features (spring sowing)											
Resistance to lodging with PGR	-	-	-	-	-	-	-	-	-	-	-
Straw height without PGR (cm)	75	77	78	77	75	74	79	72	80	77	79
Ripening (+/- Mulika, -ve = earlier)	0	2	0	+1	+1	0	+2	+2	+1	+2	+2
Resistance to sprouting	-	-	-	-	-	-	-	-	-	-	-
Disease resistance											
Mildew (1-9)	[8]	[5]	7	8	8	8	[8]	8	8	6	7
Yellow rust (1-9)	6	5	7	4	6	7	7	8	9	8	5
Brown rust (1-9)	[7]	[9]	[9]	[9]	[8]	[6]	[8]	[7]	[5]	[9]	[9]
Septoria tritici (1-9)	[7]	[6]	[6]	[6]	[5]	[7]	[6]	[6]	[6]	[7]	[6]
Orange wheat blossom midge	-	R	R	R	-	R	-	-	-	-	-
Annual treated yield (% control, spring sowing)											
2017 (7.4 t/ha)	-	-	92	106	[102]	101	-	-	[104]	[102]	101
2018 (5.5 t/ha)	-	-	[94]	[106]	[106]	[98]	-	[112]	[105]	[100]	[100]
2019 (7.0 t/ha)	103	92	93	105	100	96	108	104	103	103	98
2020 (6.4 t/ha)	[98]	[96]	[94]	[101]	[97]	[99]	[108]	[103]	[102]	[105]	[103]
2021 (7.6 t/ha)	103	96	96	100	102	103	106	[103]	105	105	99
Breeder/UK contact											
Breeder	KWS	BA	BA	KWS	KWS	KWS	KWS	WPB	KWS	KWS	KWS
UK contact	KWS	BA	Sen	KWS	KWS	KWS	KWS	LSPB	KWS	Sen	KWS
Status in RL system											
Year first listed	22	22	11	17	20	17	22	21	19	19	14
RL status	P1	P1	-	-	-	-	P1	P2	-	-	*

Winter Barley

Winter barley warrants greater consideration

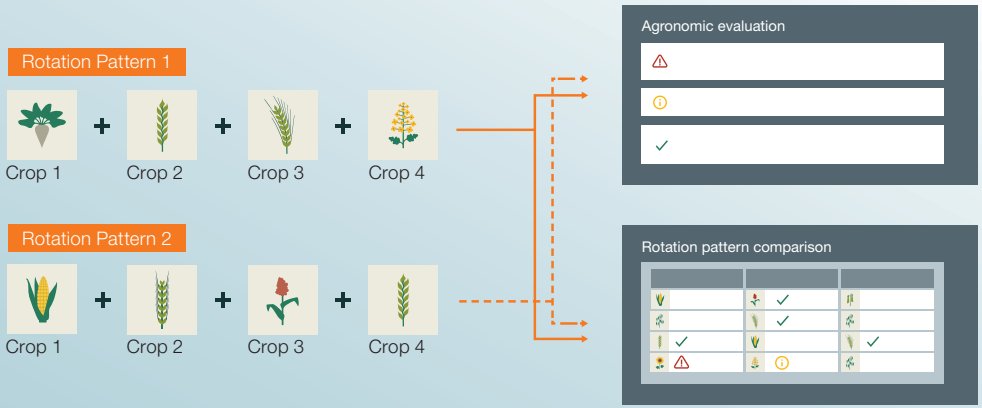
Winter barley still remains an important part of many UK growers' rotations. Better weather in the autumn, a slight increase in OSR in some rotations and better prices have promoted more growers to drill winter barley in Autumn 2021, with around 415,000 hectares expected to reach harvest in 2022. Many see the benefits of using winter barley to increase crop diversity, while others argue that it can be a more profitable option than second wheat. This is due to its higher yield potential and lower input requirements. What's more, our new product, KWS Feeris also offers growers the traditional benefits of winter barley but with added peace of mind in this post neonicotinoid era, thanks to its built-in BYDV tolerance (page 62).

Reasons to grow winter barley

- It is often the first crop to be harvested, helping to spread the summer workload and make way for cultivations: for many, there is no better entry for oilseed rape.
- Given the same fertiliser regime as wheat (170-220 kg N/ha), it delivers similar yields and often does better in the second cereal situation.
- Variable costs are roughly 75% of wheat.
- Fungicide timings are typically a week earlier than wheat, helping to spread the sprayer workload and reduce the pressure on wheat application timings.
- Investment in breeding is bringing better disease and virus resistance: in 2018 KWS introduced Amistar, a BYDV tolerant six-row variety.
- Investment in breeding is also delivering varieties with better yield potential: the leading two-row varieties offer yields comparable with that achieved by the best six-rows.

Optimise your crop rotation!

The myKWS Crop Manager tool makes it possible to experiment digitally with different crop rotations. The economic and agronomic evaluations support you in planning suitable crop rotations for your fields.



1. Helpful when making relevant decisions in a variety of situations
2. Easy and direct comparison of crop rotations
3. Agronomic evaluation of crops and rotation patterns to minimise risks

Varieties featuring the Cereals360 logo can be viewed on the KWS Virtual World **www.cereals360.co.uk**

Two Row Feed

KWS TARDIS

AHDB RECOMMENDED

Details

Group	Year Listed	UK Treated Yield	Parentage
Two Row Feed	2021	105%	11-12 x KWS Orwell

Comments

New for winter barley growers is KWS Tardis, the 2-row winter feed variety that's set to become a firm farm favourite. It's the UK's highest yielding 2-row winter feed barley, with a performance that rivals many of the 6-row hybrid and conventional types. It is especially strong in the East (106%), and thanks to its super stiff straw, performs well on heavy land where it delivers yields of 109% controls.

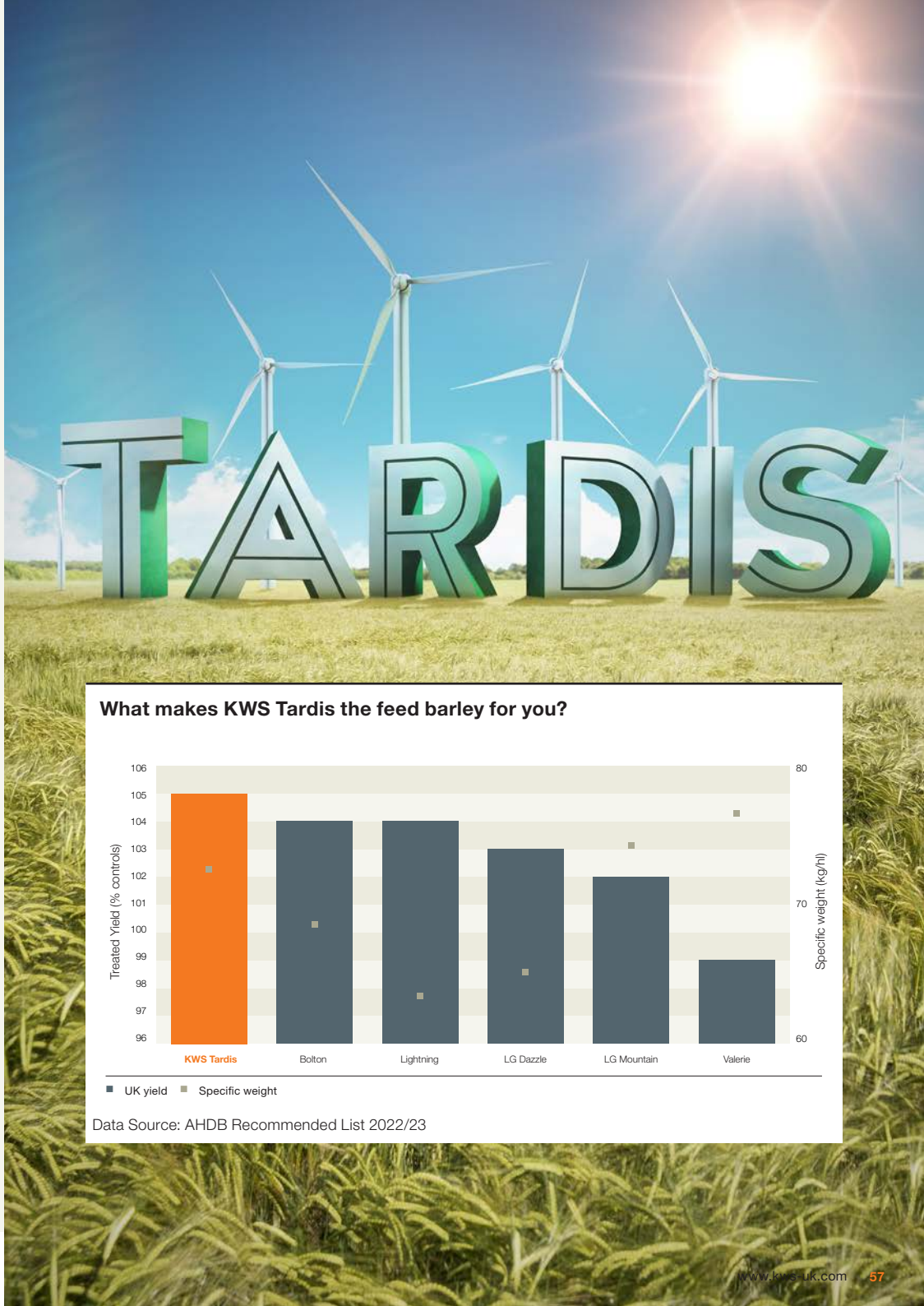
But it doesn't stop there. KWS Tardis also has an excellent disease package, boasting a score of 7 for *Rhynchosporium* and 5 for net blotch. Not only that but it has one of the best untreated yields available (85% treated controls). It's also early to mature (0) and delivers marketable grain with a very good specific weight (70.2 kg/hl) and low screenings.

In short, KWS Tardis has it all – yields, stem stiffness, grain quality, performance across the rotation, and a good disease package.

KWS Tardis: why plant anything else?

"Obviously, its headline figure is the yield, but there's a lot more to KWS Tardis than just that. It's got a really strong set of features that will make it appeal to all barley growers, wherever they are. In the East, that yield figure and high specific weight are really going to make it attractive to any feed barley grower, but the variety's *Rhynchosporium* score of 7 helps make it a safe bet wherever you are. In the West of the country, for example, a strong *Rhynchosporium* score is important in potentially wetter conditions, but KWS Tardis' long, tall straw is going to be an added bonus to livestock producers and home-feeders in the region."

Duncan Durno
Arable Technical Manager, Openfield



What makes KWS Tardis the feed barley for you?

Data Source: AHDB Recommended List 2022/23

KWS HAWKING

AHDB RECOMMENDED

360

Details

Group	Year Listed	UK Treated Yield	Parentage
Two Row Feed	2020	101%	(11-12 x California) x KWS Tower

Comments

KWS Hawking has exceptional yield potential and will appeal to growers in the East (102%) and West (101%), where, in KWS trials, its best performances have been seen to date. It is a low-risk variety with no major weaknesses and is a natural progression from KWS Orwell for growers that are looking for a step-up in yield; it's also the ideal choice for growers looking for that same stiff straw they've come to rely upon with Orwell. KWS Hawking does not require the same attention to detail on PGR applications as many commercialised 2-rows, which will be a big bonus for those looking to reduce inputs or stretch application windows.

KWS Hawking boasts a strong set of agronomic features with no major disease weaknesses and resistance to BaYMV. An added benefit is that KWS Hawking is an earlier maturing type; in KWS trials for the past few seasons, KWS Hawking has been significantly ahead of its stablemates in reaching ear emergence in May.

KWS ORWELL

AHDB RECOMMENDED

360

Details		Comments
Group	Two Row Feed	Launched in the UK five years ago, KWS Orwell has earned itself a reputation as the nation's favourite winter feed barley, and for good reason too: KWS Orwell is super consistent, no matter the site nor the season, it continues to deliver good yields and is totally dependable in all weathers. It is a short and stiff winter barley, with good all-round disease resistance scores. KWS Orwell is a package that will be attractive to those on mixed farms and on more fertile soils. Good physical grain quality and low screenings complete the package.
Year Listed	2016	
Treated Yield	100%	
Parentage	KWS Tower x KWS Salsa	

KWS CRESWELL

AHDB RECOMMENDED

Details		Comments
Group	Two Row Feed	With its early maturity and ease of harvest inherited from its KWS Cassia parentage, KWS Creswell is ideally suited to tackle the challenges Northern farmers face. It has good *Rhynchocporium* (6) resistance along with a short and stiff straw. KWS Creswell will benefit from a comprehensive fungicide programme. Grain quality is good with a strong specific weight (69.4 kg/hl) and low screenings to ensure a marketable heap for use both on and off the farm.
Year Listed	2017	
Treated Yield	100%	
Parentage	KWS B105 x KWS Cassia	

KWS CASSIA

AHDB RECOMMENDED

Details		Comments
Group	Two Row Feed	An ever-popular bold grained variety with great specific weight, KWS Cassia is still grown across large swathes of the UK winter barley area. KWS Cassia is free tillering and easy to grow; over the years, many growers have seen the benefits of the variety's ability to hold onto green leaf right through the grain-fill period and provide good solid yields of marketable grain. KWS Cassia is medium height, stiff-strawed and requires only a basic PGR regime to ensure the security of grain through to harvest. 12 years on, it's still depended upon to deliver grain for home feeding and the domestic feed market.
Year Listed	2010	
Treated Yield	97%	
Parentage	((Eden x Carat) x Saffron)	

Winter Barley Recommended List 2022/23, Two Row Feed

Page 1

	KWS Tardis	Bolton	Lightning	Bordeaux	LG Dazzle	LG Mountain	KWS Gimlet	Jordan	KWS Hawking	Surge	LG Flynn	KWS Orwell	KWS Creswell	Valerie	California	KWS Cassia
End-use group	Two-row feed															
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	N	UK	W	UK
Variety status			NEW		NEW	C	*	*			*		*			
Fungicide-treated grain yield (% treated control)																
United Kingdom (9.8 t/ha)	105	104	104	103	103	102	102	101	101	101	101	100	100	99	98	97
East region (9.6 t/ha)	106	105	104	105	104	103	104	103	102	102	101	100	100	100	100	97
West region (10.0t/ha)	104	102	[103]	101	[101]	102	100	101	101	100	100	101	99	99	98	98
North region (10.0 t/ha)	104	103	103	103	102	102	99	98	99	98	100	99	100	99	[96]	96
Untreated grain yield (% treated control)																
United Kingdom (9.8 t/ha)	85	84	88	81	87	82	82	86	81	87	81	80	75	82	79	81
Main market options																
MBC malting approval for brewing use	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grain quality																
Specific weight (kg/hl)	70.2	69.5	68.6	70.7	68.9	70.5	69.5	69.8	69.4	70.1	70.9	68.8	69.4	70.9	68.8	72.1
Screenings (% through 2.25 mm)	1.4	1.3	1.9	0.9	1.8	1.9	2.0	1.3	1.8	1.5	1.3	1.6	1.8	0.4	1.8	1.2
Screenings (% through 2.5 mm)	4.3	4.2	5.6	2.7	5.4	6.0	5.9	3.7	5.6	4.7	3.7	4.9	5.8	1.0	5.9	3.5
Nitrogen content (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Status in RL system																
Year first listed	21	21	22	21	22	19	19	20	20	16	19	16	17	19	13	10
Agronomic features																
Resistance to lodging without PGR (1–9)	8	7	[6]	7	[7]	6	6	6	7	7	7	7	7	7	7	7
Resistance to lodging with PGR(1–9)	8	8	6	8	7	6	6	6	8	7	7	8	7	8	7	7
Straw height without PGR (cm)	95	95	[92]	94	[92]	92	102	92	94	93	98	93	96	94	96	96
Straw height with PGR (cm)	86	83	88	85	85	83	95	84	85	85	91	85	88	86	90	89
Ripening (+/-KWS Orwell, -ve = earlier)	0	0	0	0	0	-1	1	1	1	0	1	0	0	-1	0	1
Disease resistance																
Mildew (1–9)	5	6	7	6	6	5	7	6	5	6	5	3	4	6	6	5

Winter Barley Recommended List 2022/23, Two Row Feed

Page 2

	KWS Tardis	Bolton	Lightning	Bordeaux	LG Dazzle	LG Mountain	KWS Gimlet	Jordan	KWS Hawking	Surge	LG Flynn	KWS Orwell	KWS Creswell	Valerie	California	KWS Cassia
End-use group	Two-row feed															
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	N	UK	W	UK
Variety status			NEW		NEW	C	*	*			*		*			
Disease resistance (continued)																
Brown rust (1–9)	6	6	8	6	8	7	6	8	6	7	7	7	6	5	5	7
Rhynchosporium (1–9)	7	5	6	4	7	6	6	7	6	7	5	6	6	6	6	5
Net blotch (1–9)	[5]	[5]	[5]	[5]	[4]	5	5	5	6	5	5	5	5	[6]	6	5
BaYMV	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Breeder/UK contact																
Breeder	KWS	Ack	Ack	NS	Lim	LimEur	KWS	Ack	KWS	SyP	LimEur	KWS	KWS	Bre	Lim	KWS
UK contact	KWS	ElsAck	ElsAck	Sen	Lim	Lim	KWS	ElsAck	KWS	Syn	Lim	KWS	KWS	Sen	Lim	KWS
Annual treated yield (% control)																
2017 (10.0 t/ha)	-	-	-	-	-	101	103	101	101	99	100	101	98	100	100	97
2018 (10.3 t/ha)	105	103	-	104	-	103	100	101	103	99	102	101	101	101	98	97
2019 (10.4 t/ha)	104	103	103	104	101	103	102	101	100	101	100	99	98	-	97	96
2020 (9.2 t/ha)	103	104	104	102	103	104	101	100	100	100	101	101	101	99	96	97
2021 (9.5 t/ha)	105	102	103	101	101	100	99	99	99	101	100	100	100	99	98	98
Soil type (about 50% of trials are medium soils)																
Light soils (9.5 t/ha)	103	104	102	103	102	102	100	100	99	100	101	99	101	99	96	97
Heavy soils (9.5 t/ha)	109	105	102	104	105	103	102	102	104	103	101	100	[99]	[99]	[100]	98
Agronomic characteristics																
Lodging without PGR (%)	2	4	[12]	3	[5]	8	16	13	3	3	6	3	7	3	3	5
Lodging with PGR (%)	1	1	10	1	5	6	9	7	1	3	3	2	4	2	3	4
Brackling (%)	7	10	11	10	8	27	9	9	6	8	6	9	13	6	8	10
Malting quality																
Hot water extract (l deg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Status in RL system																
Year first listed	21	21	22	21	22	19	19	20	20	16	19	16	17	19	13	10
RL status	P2	P2	P1	P2	P1	-	*	*	-	-	*	-	*	-	-	-

BYDV

Barley Yellow Dwarf Virus (BYDV) is distributed worldwide and infects most cereals and grasses. It is transmitted persistently by more than 20 aphid species. Symptoms were first observed in 1951 on barley in California and were later characterized in oat and wheat. It has since been identified worldwide.

Barley Yellow Dwarf symptoms include stunting and leaf discolouration, though it is often misdiagnosed because they resemble plant nutrient deficiencies. The stunted plants often appear in circular patches or as randomly scattered plants within a field. Leaf discolouration varies from shades of yellow to red or purple. High light intensity and cool temperatures (15 to 18°C) have been found to favour expression of BYDV symptoms.

BYDV trial field

Symptom expression is generally dependent on the time of infection. Seedling infection may be lethal or cause a distinct yellowing of older leaves. Plots with post-seedling infections have a yellowed or reddened flag leaf. Disease symptoms usually appear in late spring at stem extension as a result of autumn infection and yield losses of up to 63% have been observed. Spring infections have delayed symptoms which are usually less severe, though yield losses of up to 41% have been recorded.

The most important aphid vectors in the UK are the bird-cherry oat aphid (*Rhopalosiphum padi*) and the grain aphid (*Sitobion avenae*). Aphids acquire BYDV by feeding on infected plants and transmit the virus in subsequent feedings. The virus survives in perennial grasses and is spread by aphids to and within crops. The virus is persistent, meaning once infected, aphids remain infected for the rest of their life.

The scale of the problem in UK Agriculture today

Traditional high-risk BYDV regions of the UK are coastal areas of the South, South East and South West. However, when autumn-early winters are mild, almost any part of the UK can suffer damaging infections.

2019 was the first season where barley was drilled without seed treatments to control BYDV. Rain during key drilling timings will have delayed or inhibited planting, reducing the risk of BYDV during that growing season. We may see high-pressure seasons in the future if growers push to drill as early as possible.

What can plant breeding offer?

Genetic tolerance or resistance to BYDV will offer growers a risk reduction tool for aphid prone areas, opportunities for growers to continue traditional sowing timings, and will be an essential element of an effective IPM strategy.

Tolerance

- Best characterized gene in barley is ryd2
- Infected plants show little or no symptoms
- No yield loss in crop in low-mid infection
- Virus still present in crop
- KWS Feeris offers genetic tolerance to BYDV

Resistance

- A resistant crop can not be infected – there is no yield loss
- Resistance can be against the aphid vector or the virus
- No commercialised barley in the UK market has full resistance to date

Map showing high and medium risk areas for BYDV

Six Row

KWS FEERIS

NEW

Details

Group	Year Listed	UK treated yield	Parentage
Six Row Feed BYDV Tolerance	2022	103%	Amistar x KWS Kosmos

Comments

KWS Feeris is a conventional 6-row feed barley that brings BYDV tolerance to the UK market in a good barley package. Like other 6-row barleys KWS Feeris has excellent yield potential (103%) and really stands out in the BYDV hotspot of the West where it achieves its highest yield potential ([105%]).

The variety has a good all-round disease package, including impressive 6s for *Rhynchosporium* and net blotch, coupled with all-important BaYMV resistance and BYDV tolerance. It is a reasonably tall variety, which will aid blackgrass control, but it is stiff strawed which will benefit growers on heavier land. KWS Feeris has a similar maturity to KWS Orwell and at harvest will deliver heaps of quality grain with a specific weight of 69.5kg/hl and very low screenings (0.7% through 2.25mm sieve).

In short, KWS Feeris is a great variety in its own right but coupled with the added benefit of BYDV tolerance, it makes it the only solution for those looking to grow barley in high BYDV hotspots or those looking to push drilling as early as possible.

So, for growers looking to reduce inputs and produce a more sustainable winter barley crop this season, KWS Feeris is the only barley they need to put in the drill.

"The fall out of autumn 2020 brought home just how missed products like Deter are and how important alternative solutions are going forward. The problem in 2021 was that growers were able to get crops in early, but then the weather came in and really delayed spraying. It just highlights how much of a struggle it can be in the autumn if you do want to get crops in the ground early and then can't get on with pyrethroids. In bad spots, infection can be devastating, with up to 30-40% yield losses seen. From an IPM point of view, KWS Feeris means we can be less reliant on pyrethroids too – which will ultimately help to protect their longevity – and in all crops, I think there will be a bigger emphasis on genetics over the coming years. Genetics is going to help when chemistry no longer can."

Phillip Simons
Partner at Prime Agriculture

Winter Barley Recommended List 2022/23, Six Row Feed

	SY Thunderbolt #	SY Kingsbarn #	SY Canyon #	SY Kingston #	Belmont #	Belfry #	Bazooka #	KWS Feeris	Funky
End-use group	Six-row feed								
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	Sp	UK
Variety status			NEW				C	NEW	C
Fungicide-treated grain yield (% treated control)									
United Kingdom (9.8 t/ha)	107	106	106	106	106	104	104	103	103
East region (9.6 t/ha)	106	106	105	105	106	104	104	103	102
West region (10.0t/ha)	108	107	[108]	108	106	106	104	[105]	104
North region (10.0 t/ha)	106	106	105	106	105	104	104	101	103
Untreated grain yield (% treated control)									
United Kingdom (9.8 t/ha)	87	84	89	88	76	87	84	84	88
Main market options									
MBC malting approval for brewing use	-	-	-	-	-	-	-	-	-
Grain quality									
Specific weight (kg/hl)	70.5	70.4	71.2	70.4	69.3	69.1	70.0	69.5	69.8
Screenings (% through 2.25 mm)	1.8	1.4	1.8	2.5	2.4	2.4	2.2	0.7	3.4
Screenings (% through 2.5 mm)	7.2	5.7	6.4	8.6	8.8	9.1	7.7	3.7	13.2
Nitrogen content (%)	-	-	-	-	-	-	-	1.75	-
Status in RL system									
Year first listed	21	19	22	21	18	16	16	22	17
Agronomic features									
Resistance to lodging without PGR (1–9)	5	6	[7]	6	6	7	6	[8]	8
Resistance to lodging with PGR(1–9)	5	7	5	5	6	7	6	7	7
Straw height without PGR (cm)	114	112	[118]	118	112	110	117	[102]	97
Straw height with PGR (cm)	104	103	106	107	105	101	107	95	91
Ripening (+/-KWS Orwell, -ve = earlier)	-1	0	-1	-1	0	0	0	0	-1
Disease resistance									
Mildew (1–9)	8	7	8	7	5	6	5	4	5
Brown rust (1–9)	6	5	6	6	4	6	5	5	7
Rhynchosporium (1–9)	6	5	6	6	7	7	6	6	6
Net blotch (1–9)	[6]	5	[5]	6	5	5	5	[6]	5
BaYMV	R	R	R	R	R	R	R	R	R
Breeder/UK contact									
Breeder	SyP	SyP	SyP	SyP	SyP	SyP	SyP	KWS	KWSMR
UK contact	Syn	Syn	Syn	Syn	Syn	Syn	Syn	KWS	KWS

SP= KWS Feeris has a specific recommendation for BYDV tolerance

Winter Barley Recommended List 2022/23, Six Row Feed

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	SY Thunderbolt #	SY Kingsbarn #	SY Canyon #	SY Kingston #	Belmont #	Belfry #	Bazooka #	KWS Feeris	Funky
End-use group	Six-row feed								
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	Sp	UK
Variety status			NEW				C	NEW	C
Annual treated yield (% control)									
2017 (10.0 t/ha)	-	106	-	106	106	106	106	-	105
2018 (10.3 t/ha)	106	107	-	106	106	104	103	-	102
2019 (10.4 t/ha)	107	106	106	106	105	104	104	103	103
2020 (9.2 t/ha)	106	105	105	107	106	105	104	102	103
2021 (9.5 t/ha)	108	107	108	107	105	104	106	103	103
Soil type (about 50% of trials are medium soils)									
Light soils (9.5 t/ha)	103	105	105	105	104	102	104	101	102
Heavy soils (9.5 t/ha)	107	104	105	103	103	106	104	104	103
Agronomic characteristics									
Lodging without PGR (%)	20	12	[6]	13	12	6	8	[1]	1
Lodging with PGR (%)	16	5	15	14	13	3	6	4	2
Brackling (%)	17	15	11	15	18	9	12	9	12
Malting quality									
Hot water extract (l deg/kg)	-	-	-	-	-	-	-	297.0	-
Status in RL system									
Year first listed	21	19	22	21	18	16	16	22	17
RL status	P2	-	P1	P2	-	-	-	P1	-

AMISTAR

Details

Group	Year Listed	UK treated yield	Parentage
Six Row Feed BYDV Tolerance	EU Common Catalogue	103%*	Confidential

Comments

In trials without BYDV pressure, Amistar yielded close to that of KWS Cassia and KWS Tower (i.e. at the average of control varieties in official trials) and had a specific weight akin to that of KWS Cassia.

In situations with high BYDV pressure, Amistar demonstrated the value of tolerance in protecting yield potential. In 2017 and 2018 trials in Cambridgeshire, where virus pressure was high, Amistar suffered yield losses of between 0.4 and 0.5%, whereas the losses from non-tolerant varieties ranged from 6 to 19%.

The variety can be used to reduce the risk to other varieties by sowing in aphid-prone areas such as headlands, beside margins or around areas difficult to spray, such as close to watercourses. Alternatively, the variety can be sown across the entire field area if desired, but it will be for the grower and their advisers to consider how to make best use of the yield protection afforded by Amistar.

It is flexible across a wide sowing window so can be sown early as per standard practice or drilled later where there is a desire to reduce the risk of infection to other varieties.

* Data source: KWS trials

FUNKY

Details

Group	Six Row Feed
Year Listed	2017
Treated Yield	103%
Parentage	Gigga x KWS Meridian

Comments

Funky has been the stalwart 6-row conventional winter feed barley on the Recommended List for many years. It performs consistently across all regions of the UK, with its best performances in the West (104%) and has very high untreated yields (88%), making it an attractive option for growers in that region. At a -1 maturity, it is one of the earliest to mature of the conventional winter barleys. Couple that with a short plant type and significantly stiffer straw compared to the 6-row hybrids, and you have an attractive 6-row option for growers to consider this autumn.

Spring Barley

Two Row Malting

KWS SASSY

AHDB RECOMMENDED

MBC Malting Barley Committee

Details		Comments
Group	Two Row Distilling	KWS Sassy is a high-yielding, non-GN-producing spring malting variety with good yields in the North (98% controls) – the traditional home of the distilling industry. KWS Sassy has excellent spirit yield and grain quality. It also has the lowest screenings of any distilling type and is one of the earlier distilling types to mature – similar to Concerto. It has full MBC approval for malt distilling use.
Year Listed	2016	
Treated Yield	97%	
Parentage	Concerto x Publican	

New up and coming spring barleys

KWS CURTIS

AHDB CANDIDATE

Details		Comments
Group	Two Row, Potential Brewing and Distilling	KWS Curtis is an exciting new addition to the list of spring malting barley candidates for harvest 2022. It combines good potential for both the brewing and distilling sectors, in a true farmer-friendly variety that can help growers meet their increasingly sustainable demands. First and foremost, it has good potential to be a dual-purpose variety for the malting industry and is currently under test by the MBC with potential for both the brewing and distilling markets thanks to its good spirit yield, hot water extract and top grain credentials. On the farm, KWS Curtis has good yields in the north (104%) and east (108%) which coupled with its earliness and super stiff straw will make it a first-choice variety for many growers. And KWS Curtis is ready to serve our future market requirements too; its combination of high yields, good alcohol yields, and strong straw makes it a step ahead of current commercialised varieties in terms of CO2 emissions, and ensures a more sustainable product for the entire supply chain.
Year Listed	Candidate	
Treated Yield	105%	
Parentage	(KWS 13-5141 x Embrace)	

AHDB RECOMMENDED

Spring Barley Recommended List 2022/23, Malting Varieties

Page 1

	Jensen	Skyway	Firefoxx	SY Bronte	Spinner	SY Tungsten	LG Diablo	Laureate	SY Splendor	RGT Planet	KWS Sassy	Fairing
End-use group	Malting varieties											
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	Sp
Variety status	NEW			NEW	NEW		C	C		C		
Fungicide-treated grain yield (% treated control)												
United Kingdom (7.4 t/ha)	105	105	103	103	103	103	102	102	102	99	97	93
East region (7.3 t/ha)	106	106	103	104	103	101	103	102	102	99	95	92
West region (7.1 t/ha)	[106]	106	103	[105]	[106]	103	101	103	102	99	98	94
North region (7.8 t/ha)	104	103	104	102	101	104	102	102	102	99	98	92
Main market options												
MBC malting approval for brewing use	T	P	-	T	T	P	F	F	P	F	N	-
MBC malting approval for malt distilling use	-	-	P	-	-	P	F	F	-	N	F	-
MBC malting approval for grain distilling use	-	-	-	-	-	-	-	-	-	N	-	F
Grain quality												
Specific weight (kg/hl)	65.9	68.7	66.4	66.8	67.5	67.7	67.1	66.6	68.1	68.0	68.6	68.1
Screenings (% through 2.25 mm)	1.4	1.0	1.4	1.3	1.2	1.7	1.4	1.3	1.4	1.2	1.0	1.0
Screenings (% through 2.5 mm)	3.4	2.6	3.7	3.0	2.9	4.5	3.3	3.1	3.6	3.1	2.4	2.6
Nitrogen content (%)	1.50	1.57	1.54	1.54	1.54	1.50	1.52	1.54	1.55	1.56	-	-
Status in RL system												
Year first listed	22	21	20	22	22	20	18	16	20	15	16	16
Untreated grain yield (% treated control)												
United Kingdom (7.4 t/ha)	96	94	92	92	96	90	92	94	90	90	89	84
Agronomic features												
Resistance to lodging without PGR (1–9)	6	7	7	7	7	7	7	6	7	7	6	8
Straw height without PGR (cm)	66	74	69	73	70	71	71	69	72	72	77	70
Ripening (+/-RGT Planet, -ve = earlier)	+1	0	0	+1	+1	+1	+2	+1	+1	0	+1	-2
Resistance to brackling (1–9)	8	8	8	8	8	8	8	8	9	8	6	8
Disease resistance												
Mildew (1–9)	8	9	9	9	9	8	9	9	9	8	9	8
Brown rust (1–9)	5	4	4	4	5	4	5	5	3	5	5	4
Rhynchosporium (1–9)	[6]	[4]	5	[5]	[4]	3	5	5	[4]	5	6	8

KWS MARONIS

AHDB CANDIDATE

Details		Comments
Group	Two Row, Potential Brewing and Distilling	KWS Maronis is a new variety for the spring malting barley arena. It is currently under evaluation to confirm its potential for both brewing and distilling by the MBC. For the grower, KWS Maronis offers good yields - especially in the distilling heartland of the north (104%). It also has a good agronomic package including a high untreated yield (92% treated controls) with excellent mildew (9) and brown rust (6) resistance. In the field, the variety has similar straw to Laureate and, at a +2 maturity, is also similar to LG Diablo.
Year Listed	Candidate	
Treated Yield	103%	
Parentage	LG Diablo x SY Ariella	

AHDB RECOMMENDED

Spring Barley Recommended List 2022/23, Malting Varieties

Page 2

	Jensen	Skyway	Firefoxx	SY Bronte	Spinner	SY Tungsten	LG Diablo	Laureate	SY Splendor	RGT Planet	KWS Sassy	Fairing
End-use group	Malting varieties											
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	Sp
Variety status	NEW			NEW	NEW		C	C		C		
Breeder/UK contact												
Breeder	Sej	NS	Ack	SyP	Sec	SyP	LimEur	SyP	SyP	RAGT	KWS	SyP
UK contact	Lim	Agr	ElsAck	Syn	Agr	Syn	Lim	Syn	Syn	RAGT	KWS	Syn
Annual treated yield (% control)												
2017 (7.4 t/ha)	-	-	103	-	-	102	103	100	103	100	97	92
2018 (6.8 t/ha)	-	105	104	-	-	104	102	102	103	98	97	94
2019 (7.8 t/ha)	105	105	103	104	104	102	102	102	104	100	98	93
2020 (7.5 t/ha)	104	105	102	103	102	103	102	102	102	99	97	91
2021 (7.6 t/ha)	107	104	106	103	104	103	102	104	99	97	96	93
Malting quality												
Hot water extract (l deg/kg)	314.0	314.1	313.4	314.8	313.2	314.4	314.1	313.8	313.6	313.3	-	[306.3]
Status in RL system												
Year first listed	22	21	20	22	22	20	18	16	20	15	16	16
RL status	P1	P2	-	P1	P1	-	-	-	-	-	-	-

Winter Oilseed Rape

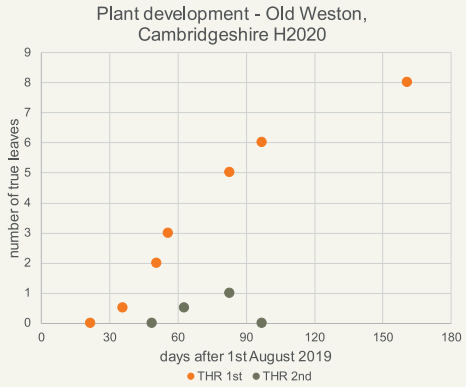
Over recent years, the key factor in establishing a successful oilseed rape crop has been the time of drilling; the earlier crops have been drilled, the better the survival rate has been. The graphs below show trial sites and date of establishment – in both instances the later drilled sites did not survive. It is still very important to ensure that there is ample soil moisture and that seed to soil contact is good.

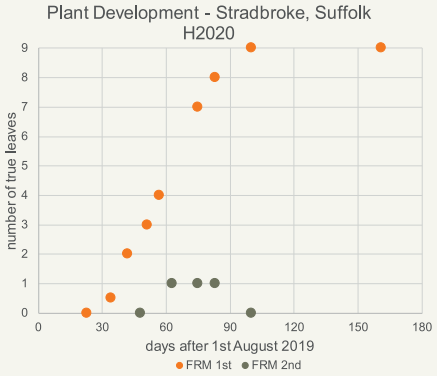
However, varieties do differ in their ability to survive later drilling, usually the hybrid varieties are better suited to later drilling.

Other factors to consider are what attributes a variety needs to be suitable for early drilling:

- Good disease resistance
  - Light leaf spot, stem canker, verticillium stem stripe
- Stiff straw
- Speed of growth both in autumn and spring

The crop will be in the ground for a longer period so it needs to have good disease resistance and straw quality. At KWS we select varieties for good disease resistance including verticillium stem stripe.



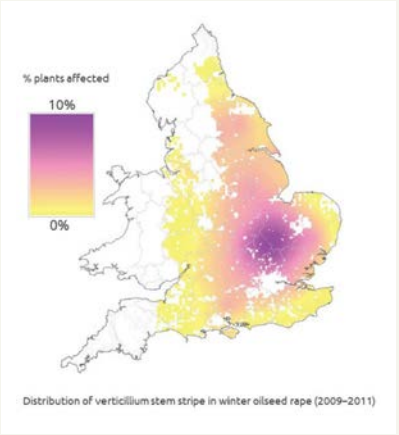


Rapid autumn growth is important as the crop needs to grow away from the pressure of cabbage stem flea beetle. However, autumn vigour on its own is not enough. Well established oilseed rape crops in the autumn are not immune to CSFB larval attacks. Plants need to have a robust growth habit and good spring vigour as well to survive these attacks. Research has shown that OSR crops that are too thick carry a heavier load of CSFB which can lead to increased pressure from larval attack - this is why it is important to sow at the correct seeding rate for your site, drill timing and soil conditions. We have seen some differences in the ability of varieties to cope with this pressure as the photos below show. These are two different varieties in neighbouring fields planted on the same day. The variety on the right has grown away from the attack with much more vigour than the variety on the left.

Key factors for successful establishment of oilseed rape

1	**Drill as early as possible**	Only if you have good soil moisture
2	**Ensure good soil to seed contact**	Rolling the field post drilling can help with this
3	**Use the correct seed rate**	Drilling seed at a very high rate can result in problems later in the year
4	**Use certified seed**	If using FSS get it tested for seed-borne disease and germination
5	**Select a variety with good autumn vigour**	Also consider what other attributes you will need to fit your rotation

Importance of Verticillium stem stripe

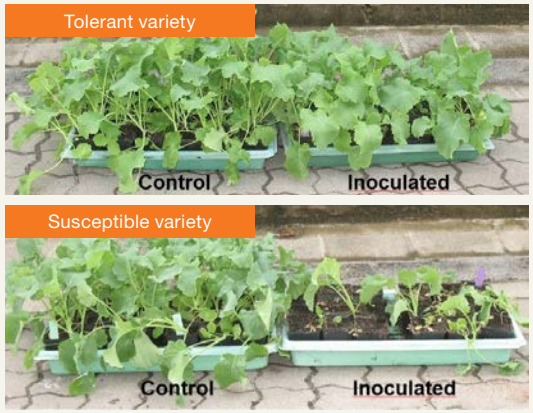


Distribution of verticillium stem stripe in winter oilseed rape (2009–2011)

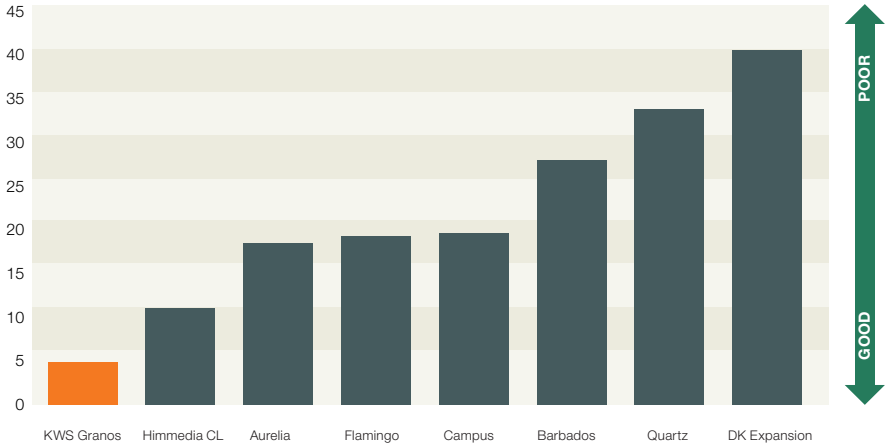
Verticillium stem stripe is a soil borne pathogen that can cause severe loss of yield in oilseed rape – its effects can easily be as serious as those caused by TuYV. The incidence of the disease is widespread across the main oilseed rape growing areas – the map from AHDB shows the historic occurrence – this has probably deteriorated further given some of the tight rotations that had become the norm when chemistry was available to control disease and pests of the crop. The problem can be ameliorated by lengthening rotations and selecting tolerant varieties.

As a soil-borne disease with many different strains, it is very difficult to breed resistant varieties. However, it is possible to test varieties for tolerance to the most common strains of the pathogen. At KWS we have long recognised the importance of verticillium stem stripe and have tested on a regular basis for many years now. In the UK ADAS carry out the work on our behalf, but we also have the facility to replicate the test in our headquarters in Einbeck. We grow plants in the glasshouse; one pot is a control grown in sterile compost, whereas the soil in the other pot is inoculated with the pathogen. The variety Catana is well recognised as a variety with good tolerance to VSS, and our aim is to identify varieties that are at least as good as Catana in terms of tolerance. Over the years this has meant discarding some promising looking material but has lifted the overall tolerance of the KWS oilseed rape portfolio in general.

Verticillium scores – Glasshouse inoculated trial Einbeck 2018



Percentage reduction in vigour with inoculated VSS



Data source: ADAS trial for KWS UK

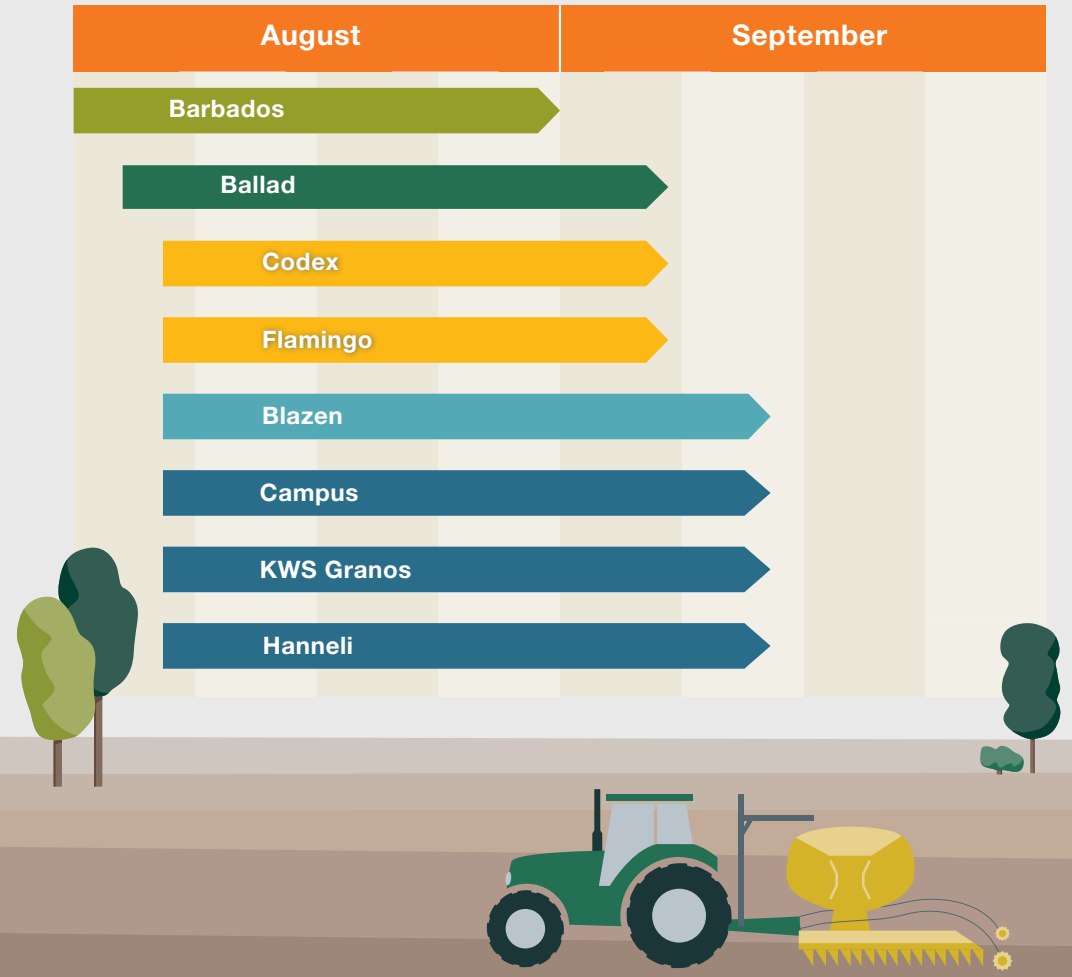
Characteristic	Campus	Flamingo	Hanneli	KWS Granos
Autumn vigour	7	7	7	8
Spring vigour	7	8	8	8
Pod fill period	5	6	6	6
Verticillium stem stripe	6	7	7	8

Data source: KWS breeder assessment

Characteristic	Campus	Flamingo	Hanneli	KWS Granos
Light leaf spot	6	7	7	7
Stem canker	6	4	8	5
Stem stiffness	8	8	8	9
Flowering time	6	6	5	5
Maturity	5	5	6	6

Data source: AHDB Recommended List trials 2022/23

OSR Optimum Drilling Times



Good establishment of your oilseed rape crop is key, and varieties differ in their suitability for early or late drilling.

One of the important factors is to get good seed to soil contact and sufficient moisture levels.

This optimum drilling chart is designed to help you select your variety to get the best performance from our oilseed rape portfolio.

Varieties featuring the Cereals360 logo can be viewed on the KWS Virtual World **www.cereals360.co.uk**

BARBADOS

Details		Comments
Scope of Recommendation	No longer listed	Well established and reliable variety with excellent disease resistance – twin 7s for LLS and stem canker as well as good tolerance to verticillium stem stripe. Suited to early drilling. Its relatively late maturity score is a reflection of good disease resistance.
Year Listed	2016	
Treated GO	101%	

CAMPUS

Details		Comments
Scope of Recommendation	RL control No longer listed	Extremely consistent variety both on farm and in trials. One of the most widely grown varieties in the UK for all of the last 7 years – reflecting both its strong vigour and consistency in its on farm performance. Good tolerance to verticillium stem stripe and twin 6s for LLS and stem canker.
Year Listed	2015	
Treated GO	102%	

Winter Oilseed Rape Recommended List 2022/23, UK

	PT303	LG Auckland	Ambassador	LG Aviron	Aurelia	Artemis	Acacia	Annika	Aardvark	Aspire	Matrix CL &	LG Constructor CL &	V 316 OL ~	DK Imprint CL &
Variety type	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Conv	Conv	Conv	Conv	Hybrid	Hybrid	Hybrid	Hybrid
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK Sp	UK Sp	UK Sp	UK Sp
Variety status	NEW	NEW				*		NEW	*	C	NEW	NEW	*	
Gross output, yield adjusted for oil content (% treated control)														
United Kingdom (5.1 t/ha)	107	107	106	105	105	104	104	103	100	100	99	96	96	92
East/West region (5.0 t/ha)	108	108	106	105	105	104	104	103	100	100	100	97	96	92
North region (5.8 t/ha)	104	[104]	104	104	105	102	104	[102]	102	100	96	[94]	97	91
Seed yield (% treated control)														
United Kingdom (4.7 t/ha)	106	107	106	107	105	104	104	103	101	100	99	98	96	94
East/West region (4.6 t/ha)	107	108	106	107	105	104	104	103	101	100	99	98	96	95
North region (5.3 t/ha)	104	[104]	105	106	106	102	104	[103]	101	100	96	[95]	97	94
Untreated gross output, yield adjusted for oil content (% untreated control)														
United Kingdom (5.1 t/ha)	-	-	107	110	106	103	104	-	104	101	-	-	98	94
Untreated seed yield (% untreated control)														
United Kingdom (4.8 t/ha)	-	-	107	111	107	103	104	-	104	101	-	-	98	96
Agronomic features														
Resistance to lodging (1–9)	[8]	[8]	8	[7]	8	8	8	[8]	8	8	[8]	[8]	8	[8]
Stem stiffness (1–9)	8	7	8	7	8	8	9	8	8	9	8	8	8	7
Shortness of stem (1–9)	5	6	6	6	6	6	7	6	6	7	5	6	6	6
Plant height (cm)	164	155	154	156	150	157	145	149	149	140	159	148	152	158
Earliness of flowering (1–9)	5	7	7	8	7	6	6	6	7	7	6	6	6	5
Earliness of maturity (1–9)	5	6	6	6	5	6	5	4	5	4	6	6	5	5
Pod shatter resistance	-	R	R	R	R	R	-	-	-	-	R	R	-	R
Disease resistance														
Light leaf spot (1–9)	7	7	7	8	7	6	6	7	7	7	6	6	6	6
Stem canker (1–9)	7	7	7	7	7	7	5	6	6	5	8	6	5	8
TuYV	R	R	R	R	R	R	-	R	-	R	R	R	-	-
Breeder/UK contact														
Breeder	PionOS	LimEur	LimEur	LimEur	LimEur	LimEur	LimEur	LimEur	LimEur	LimEur	DSV	LimEur	MonTec	MonTec
UK contact	Cor	Lim	Lim	Lim	Lim	Lim	Lim	Lim	Lim	Lim	DSV	Lim	Bay	Bay
Annual treated gross output, yield adjusted for oil content (% control) - UK														
2018 (5.6 t/ha)	-	-	103	103	104	102	104	-	102	102	-	-	96	91
2019 (5.5 t/ha)	[107]	[105]	105	105	105	104	105	[104]	101	102	[98]	[95]	95	91
2020 (5.4 t/ha)	106	107	107	108	107	103	102	101	101	98	100	97	99	95
2021 (5.1 t/ha)	105	106	104	103	105	102	103	103	101	99	96	92	96	92
Treatment benefit at co-located sites (% treated control)														
Treated gross output - UK (5.4 t/ha)	-	-	107	109	106	105	104	-	102	100	-	-	97	95
Untreated gross output - UK (5.4 t/ha) ¤	-	-	102	105	101	98	99	-	99	96	-	-	93	89
Seed quality (at 9% moisture)														
Oil content, fungicide-treated (%)	46.0	45.4	45.0	44.3	45.0	45.4	45.3	45.2	45.5	45.5	45.8	44.4	45.2	43.7
Glucosinolate (µmoles/g)	8.0	12.2	10.9	11.2	10.2	12.3	8.1	11.6	10.0	9.9	14.2	15.8	12.3	14.3
Status in RL system														
Year first listed	22	22	20	21	20	20	20	22	20	19	22	22	15	21
RL status	P1	P1	-	P2	-	*	-	P1	*	-	P1	P1	*	P2

Varieties featuring the Cereals360 logo can be viewed on the KWS Virtual World **www.cereals360.co.uk**

FLAMINGO

Details		Comments
Scope of Recommendation	No longer listed	Flamingo is a high gross output variety with good autumn vigour. It has very good resistance to LLS with a 7 rating. Stem canker needs attention with a rating of 4. It has good spring vigour and has exhibited good recovery in severe CSFB larval situations. It also has gold standard tolerance to verticillium stem stripe.
Year Listed	2017	
Treated GO	102%	

BALLAD

Details		Comments
Scope of Recommendation	No longer listed	Ballad is a high gross output variety with a consistent performance. It has excellent resistance to lodging and is rated 6 for LLS and 5 for stem canker.
Year Listed	2019	
Treated GO	100%	

BLAZEN

Details		Comments
Scope of Recommendation	North	Blazen is a high yielding variety recommended for the North with excellent standing ability. It is marketed under the KWS OEP scheme. It has a 5 rating for LLS and a 6 for stem canker and good tolerance to verticillium stem stripe.
Year Listed	2020	
Treated GO	101%	

Winter Oilseed Rape Recommended List 2022/23, North

	Amarone	Blazen
Variety type	Conv	Conv
Scope of recommendation	N	N
Variety status	NEW	*
Gross output, yield adjusted for oil content (% treated control)		
United Kingdom (5.1 t/ha)	101	99
East/West region (5.0 t/ha)	100	98
North region (5.8 t/ha)	105	101
Seed yield (% treated control)		
United Kingdom (4.7 t/ha)	101	100
East/West region (4.6 t/ha)	100	99
North region (5.3 t/ha)	105	103
Untreated gross output, yield adjusted for oil content (% untreated control)		
United Kingdom (5.1 t/ha)	-	98
Untreated seed yield (% untreated control)		
United Kingdom (4.8 t/ha)	-	99
Agronomic features		
Resistance to lodging (1–9)	[8]	[8]
Stem stiffness (1–9)	8	9
Shortness of stem (1–9)	7	6
Plant height (cm)	143	148
Earliness of flowering (1–9)	7	6
Earliness of maturity (1–9)	5	5
Pod shatter resistance	-	-
Disease resistance		
Light leaf spot (1–9)	7	7
Stem canker (1–9)	6	6
TuYV	R	-
Breeder/UK contact		
Breeder	LimEur	KWSMR
UK contact	Lim	KWS
Annual treated gross output, yield adjusted for oil content (% control) - UK		
2018 (5.6 t/ha)	-	100
2019 (5.5 t/ha)	[105]	99
2020 (5.4 t/ha)	101	100
2021 (5.1 t/ha)	102	100
Treatment benefit at co-located sites (% treated control)		
Treated gross output - UK (5.4 t/ha)	-	98
Untreated gross output - UK (5.4 t/ha)	-	93
Seed quality (at 9% moisture)		
Oil content, fungicide-treated (%)	45.1	44.5
Glucosinolate (µmoles/g)	11.9	10.7
Status in RL system		
Year first listed	22	20
RL status	P1	*

Varieties featuring the Cereals360 logo can be viewed on the KWS Virtual World **www.cereals360.co.uk**

HAYA

Details		Comments
Scope of Recommendation	NL variety	High gross output candidate variety with good standing and early maturity. Excellent resistance to stem canker (9) and medium resistance to LLS (5).
Year Listed	-	
Treated GO	113% E/W	

CODEX

Details		Comments
Scope of Recommendation	NL variety	Codex is a variety with a very reliable output and good standing ability. It is rated a 6 for LLS and has an outstanding 9 rating for resistance to stem canker. Codex is marketed under the KWS OEP scheme.
Year Listed	-	
Treated GO	101%	

AHDB RECOMMENDED

Winter Oilseed Rape Recommended List 2022/23, East/West

	LG Adonis	Dart	Tennyson	LG Antigua	Respect	Flemming	DK Expectation	Darling	Dazzler	PT279CL &	Nizza CL &
Variety type	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid
Scope of recommendation	E/W	E/W	E/W	E/W	E/W	E/W	E/W	E/W	E/W	E/W Sp	E/W Sp
Variety status	NEW	NEW	NEW			NEW		*	*		*
Gross output, yield adjusted for oil content (% treated control)											
United Kingdom (5.1 t/ha)	107	105	103	104	103	103	101	100	99	94	91
East/West region (5.0 t/ha)	108	106	104	104	104	104	102	100	99	94	91
North region (5.8 t/ha)	103	[95]	[95]	103	99	[97]	96	99	97	92	90
Seed yield (% treated control)											
United Kingdom (4.7 t/ha)	106	104	103	104	104	104	101	99	98	95	91
East/West region (4.6 t/ha)	106	106	105	104	105	105	102	99	98	95	92
North region (5.3 t/ha)	102	[96]	[96]	103	100	[98]	96	98	96	94	91
Untreated gross output, yield adjusted for oil content (% untreated control)											
United Kingdom (5.1 t/ha)	-	-	-	106	106	-	96	100	99	93	87
Untreated seed yield (% untreated control)											
United Kingdom (4.8 t/ha)	-	-	-	106	107	-	96	99	97	94	88
Agronomic features											
Resistance to lodging (1–9)	[8]	[8]	[8]	[8]	[8]	[8]	[8]	8	8	8	8
Stem stiffness (1–9)	8	9	7	8	8	9	7	8	9	8	8
Shortness of stem (1–9)	6	6	6	6	6	6	6	6	6	6	6
Plant height (cm)	149	150	150	156	156	156	150	153	148	152	147
Earliness of flowering (1–9)	7	7	6	7	7	6	8	7	8	6	7
Earliness of maturity (1–9)	5	5	5	6	5	4	6	5	6	6	5
Pod shatter resistance	-	-	-	R	-	-	R	R	R	-	-
Disease resistance											
Light leaf spot (1–9)	7	7	7	6	6	7	7	6	6	5	5
Stem canker (1–9)	8	7	9	7	7	8	7	8	8	5	6
TuYV	R	R	R	R	-	R	R	R	R	-	-
Breeder/UK contact											
Breeder	LimEur	DSV	SyP	LimEur	NPZ	NPZ	MonTec	DSV	DSV	PionOS	R2n
UK contact	Lim	DSV	Els	Lim	LSPB	LSPB	Bay	DSV	DSV	Cor	RAGT
Annual treated gross output, yield adjusted for oil content (% control) - UK											
2018 (5.6 t/ha)	-	-	-	104	101	-	99	98	97	94	91
2019 (5.5 t/ha)	[106]	[101]	[100]	104	102	[101]	100	101	101	91	92
2020 (5.4 t/ha)	104	101	101	104	103	100	100	101	98	93	87
2021 (5.1 t/ha)	104	99	97	102	100	100	95	97	95	93	90
Treatment benefit at co-located sites (% treated control)											
Treated gross output - UK (5.4 t/ha)	-	-	-	105	103	-	97	100	98	93	90
Untreated gross output - UK (5.4 t/ha) ¤	-	-	-	101	101	-	92	95	94	89	83
Seed quality (at 9% moisture)											
Oil content, fungicide-treated (%)	46.4	45.5	45.2	45.4	44.9	44.8	45.2	46.0	46.1	44.8	44.7
Glucosinolate (µmoles/g)	9.7	10.0	11.1	11.5	11.8	12.0	12.2	12.2	11.1	10.9	14.9
Status in RL system											
Year first listed	22	22	22	21	21	22	21	20	20	19	20
RL status	P1	P1	P1	P2	P2	P1	P2	*	*	-	*

Oilseed Rape Candidates

KWS GRANOS

AHDB CANDIDATE

Details		Comments
Scope of Recommendation	East / West	KWS Granos is a new generation hybrid with all the bolt-on traits growers expect. KWS Granos is a very high gross output variety with an oil content of 44.6%. It has a very vigorous autumn growth and excellent standing. It also has medium flowering and maturity, in addition to the PoSh gene. In terms of disease resistance, KWS Granos has a strong package with good resistance to LLS (7) and tolerance to TuYV. In our KWS verticillium pot test, KWS Granos had an outstanding performance, better than all the current standards. Stem Canker resistance is medium rated at a 5.
Year Listed	RL Candidate	
Treated GO	108%	

HANNELI

AHDB CANDIDATE

Details		Comments
Scope of Recommendation	East / West	Hanneli is a high gross output variety with very strong autumn and spring vigour. It is a short strawed variety with good resistance to lodging and standing ability. It has medium flowering and maturity and has the PoSh gene. Hanneli has an excellent disease package with a 7 for LLS and an 8 for stem canker (RLM7). It also has a very good tolerance to verticillium stem stripe and TuYV.
Year Listed	RL Candidate	
Treated GO	106%	

The KWS Oilseed Establishment Partnership

Going 50:50 with oilseed rape establishment

The KWS Oilseed Establishment Partnership (OEP) is a new scheme to help growers with the risk of growing oilseed rape.

The KWS Oilseed Establishment Partnership (OEP) launched in 2019 is designed to give producers the confidence to continue growing the crop.

Nobody is negating the very real problems many growers face in parts of the country but equally, we know there is a significant number of growers out there that recognise oilseed rape is still the best break crop option they have.

KWS wants to give growers as much support as we can, working with the distributor trade to give them access to the most cost-effective genetics and latest knowledge on crop establishment.

Essentially, growers will pay 50% of their oilseed rape seed costs upfront and the second half of the payment once the crop is established. The partnership will be available nationwide through a network of 12 merchants and seed suppliers, with different variety options.

We estimate that around 5% of the 2020 oilseed rape crop was lost nationally and the OEP is a way of reducing some of the risks that growers face. It shares the risk of oilseed rape establishment between the grower, the merchant and the breeder.

Here's how OEP works:

- The grower pays a lower price for the seed that is sown and then once the crop is drilled pays the balance, based on the area established, in November. This allows the grower to adjust seed rates at a lower cost and improves cash flow.
- The scheme is available to all growers via a simple online sign up and is managed by the British Intellectual Property Office (BIPO).
- Another feature of the OEP is a 'best practice' information sharing platform for growing the variety each season.

To find out more about the partnership, please scan the QR code

Hybrid Rye: the cereal with much to offer!

KWS Group is the leading breeder of hybrid rye, with a long term hybrid breeding programme established in the mid-1980s. Offering varieties for wholecrop (as silage, or AD/biogas feedstock) or grain production (for feed grain, flour and distilling).

Today hybrid rye is grown on over 5 million hectares worldwide in Europe, Russia, Canada and the United States.

For the UK and Ireland, KWS believes this highly productive cereal offers new perspectives for farmers and end-users alike!

Join the Ryevolution!

Top reasons to consider growing hybrid rye in 2022:

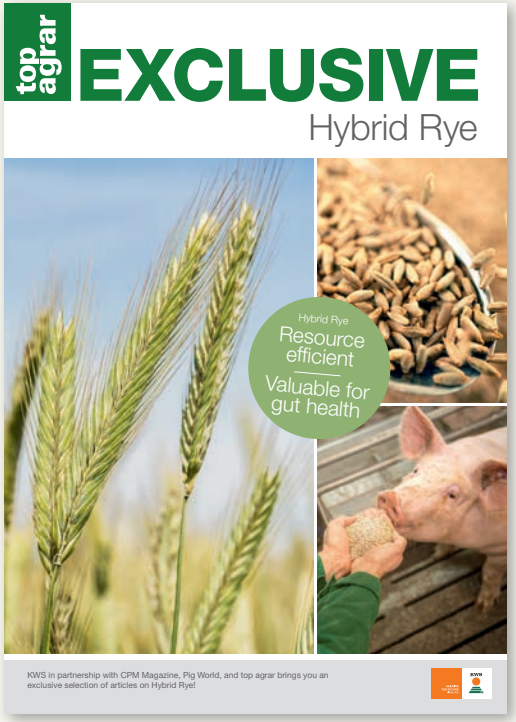
- Hybrid rye delivers consistent grain yields in the 2nd cereal slot
- Low nitrogen input – saving around 100 kg/ha N compared to 2nd wheat
- Low disease risk – rye typically only requires 1-2 fungicides to control brown rust
- High straw yields – ideal for livestock or renewables
- Growing demand from pig finishing units, distillers and millers
- Fit for the future; under the UK's agricultural bill, rye delivers nitrogen and agrochemical savings without compromising yields

Hybrid Rye - a high quality feed!

In Denmark, Germany, Russia, Poland, and Spain, rye is already rapidly becoming an established component of pig rations. KWS, in partnership with farmers and feed experts, are now extending hybrid rye uptake in the USA and Canada with a strong interest in what rye can offer.

Rye can boost gut health:

- Reduce feed costs: Rye is a low input, high yielding cereal – diet inclusions (of up to 70%) give maximum return on feed costs
- Behaviour: Rye raises satiety levels and leads to less tail biting & fighting over feed
- (SCFA)s*: from rye boost gut microflora, reducing salmonella gut wall attachment
- Less gut ulceration: Rye demands more active chewing & saliva uptake – this reduces feed acidity upon stomach entry



*Short Chain Fatty Acids

Sources:
DCA - Danish Centre for Food and Agriculture - Aarhus University 2013.
Impact of physical form of animal diets - Kamphues 2018. Grone et al 2020.

Download your copy!

KWS in partnership with CPM Magazine, Pig World, and top agrar brings you an exclusive selection of articles on Hybrid Rye!

PollenPlus® KWS files for 'ergot' patent in hybrid rye

"Ergot is the curse of rye, but since moving to a fully hybrid variety this has become less of a concern.

We moved to KWS Bono a few years ago partly for the higher yield potential, but also because the higher quantities of pollen these PollenPlus® varieties produce.

With milling wheat on the farm too we need to be proactive and PollenPlus® varieties have helped greatly."

David Lord
Earls Hall Farm, Clacton on Sea

JSR looking to rye to benefit the pig and arable sides of the business

"With industry results having shown a potential for improved gut health, which in turn leads to improved health, behaviour and performance.

We were keen to test the cereal for ourselves and were pleased with the results.

Rye now features as a permanent addition to our rotation and we're excited to see how pigs at other stages of the production cycle perform on it."

Stephen Waite
JSR's Managing Director of Pigs & Genetics

AHDB DESCRIBED

Winter Rye Descriptive List 2022/23

	KWS Tayo	KWS Serafino
Variety type	**Hybrid**	
Grain yield (as % treated control)		
Fungicide-treated (10.2 t/ha)	104	102
Agronomic features		
Lodging (%)	[3]	[4]
Straw length (cm)	128	130
Ripening (days +/- SU Mephisto, -ve = earlier)	+1	+1
Grain quality		
Protein content (%)	9.6	9.5
Hagberg Falling Number	259	258
Specific weight (kg/hl)	76.6	76.7
Disease resistance		
Brown rust (1–9)	[7]	7
Status in DL system		
Year first listed	22	21

Spring Oats

Spurred on by reports that oats are the 'healthy cereal' that's a natural way to reduce cholesterol and a good source of manganese and vitamin B12, consumer demand for oats and oat-based foods is steadily increasing. There is considerable opportunity for more growth.

Helped by increasing demand, the area of oats grown in England has been steadily increasing. Since 2016 the sown area has grown by more than 30%, and the forecasted demand is set to increase year on year, making this crop an attractive option for a partial take-all break in the rotation.

Husked

WPB ISABEL		Comments
Details		
Type	Husked	WPB Isabel is the first choice spring oat for UK millers with superior agronomics to match. From the stable that has already delivered WPB Elyann to the market, this Wiersum line will appeal to growers looking for a high-yielding spring oat with excellent grain quality.
Year Listed	2020	
Treated Yield	105%	
Parentage	Husky Cross	

WPB ELYANN		Comments
Details		
Type	Husked	WPB Elyann is an exciting spring oat! It offers high yields and the best kernel content of any recommended varieties (76.1%). Not only that, it will be one of the first varieties to mature, ripening ahead of all other listed varieties. As well as good agronomics, it has wide market appeal. WPB Elyann is already generating strong interest from the millers, as it has the right attributes for the milling market.
Year Listed	2017	
Treated Yield	98%	
Parentage	(Ivory x LW 00W035-01) x LW 97W020-01	

Spring Oats Recommended List 2022, Husked Varieties

	Delfin	Merlin	WPB Isabel	Yukon	Canyon	Aspen	Conway	Lion	WPB Elyann
Variety type	Husked varieties								
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	UK	UK
Variety status		NEW			C	C		NEW	C
UK yield (% treated control)									
Fungicide-treated (6.8 t/ha)	106	105	105	104	103	100	99	99	98
Untreated (% of treated control)	102	99	90	100	97	87	90	85	88
Grain quality									
Kernel content (%)	72.3	72.6	74.4	72.6	72.7	73.1	73.0	76.2	76.1
Specific weight (kg/hl)	50.6	51.1	53.6	49.6	51.3	51.2	50.0	52.1	50.4
Screenings (% through 2.0 mm)	2.7	1.6	1.9	2.9	2.4	2.1	1.9	1.9	2.6
Screenings (% through 1.8 mm)	-	-	-	-	-	-	-	-	-
Agronomic features									
Resistance to lodging without PGR (1–9)	7	[7]	7	7	7	6	7	[7]	6
Straw length without PGR (cm)	111	[105]	108	105	109	98	104	[104]	99
Ripening (days +/- WPB Isabel, -ve = earlier)	-0	-1	+0	-0	-1	-0	-1	-1	-1
Disease resistance									
Mildew (1–9)	8	8	5	8	8	4	5	3	4
Crown rust (1–9)	4	[3]	5	5	4	5	4	[5]	5
Annual treated yield (% control)									
2017 (7.2 t/ha)	[112]	-	[111]	[106]	[103]	[101]	[98]	-	[96]
2018 (6.0 t/ha)	[106]	[104]	[101]	[100]	[96]	[102]	[96]	[101]	[102]
2019 (7.1 t/ha)	[104]	[110]	[105]	[105]	[105]	[100]	[98]	[101]	[95]
2020 (6.1 t/ha)	[106]	[101]	[103]	[105]	[104]	[96]	[102]	[95]	[100]
2021 (7.7 t/ha)	[105]	[105]	[104]	[102]	[104]	[99]	[102]	[99]	[97]
Breeder/ UK contact									
Breeder	Nord	Selg	Wier	Nord	Nord	Bau	IBERS	Nord	Wier
UK contact	SU	Cope	KWS	SU	SU	Sen	Sen	SU	KWS
Status in RL system									
Year first listed	18	22	20	17	11	15	14	22	17
RL status	-	P1	-	-	-	-	-	P1	-

Peas

Most growers will be aware of the obvious benefit of growing peas; they are leguminous and therefore require no nitrogen, which makes them a cheap crop to grow. Include in the mix; the increase in insect biodiversity and increase in soil microbial activities - both of which have been proven to aid future crops - and they really start to look attractive.

Not forgetting that the political focus is firmly on the environment and reducing carbon within agriculture, the new agricultural bill clearly suggests this will be the case ensuring peas will have a big part to play.

Finally, the UK demand for large blue peas and white peas is increasing year on year due to strong export demand to Asia and new vegan batters and coating made from peas. For spring 2022, we have strong contracts available on farm, allowing growers to capitalise on the emerging markets for plant-based foods.

Large Blue Pea

MANKATO		
Details		**Comments**
Year Listed	2019	Mankato is a high-yielding large blue pea with medium height and exceptional standing to ensure a safe harvest. It is liked by end-users for its good colour retention which helps growers attract a high premium for reducing bleaching when being sold. It offers a high protein of 22.2% dried and has a good all-round disease package including resistance to pea wilt.
Treated Yield	96%	

Data source: PGRO descriptive list 2022

GOTHAM		
Details		**Comments**
Year Listed	DL candidate	■ High yielding large blue pea candidate ■ Very stiff straw ■ Large seed size ■ Good sample for micronizing and cannery markets
Treated Yield	125% of controls	

NEW

Data source: KWS

White Pea

MANAGER		
Details		**Comments**
Year Listed	2018	Manager is a very high-yielding yellow pea that performs nationally over a range of soil types. It offers class leading downy mildew resistance and is resistant to pea wilt. It has very a short stiff straw allowing for a safe harvest. Its large seed size is favoured by end-users for splitting and protein extrusion also.
Treated Yield	108%	

Data source: PGRO descriptive list 2022

MAIZE

KWS Maize Hybrids

my KWS

KWS has a wide range of top-performing maize varieties to suit all farm situations and offers timely advice and support across the seasons, to help you get the best out of your crop.

This includes the free **myKWS** service, where you can go online to find digital tools like the Soil Temperature Service and the Seed Rate Calculator.

The myKWS App is out now on the App Store and Google Play!

ANDROID APP ON Google play

Download on the App Store

With you throughout the year...

myKWS **MAIZE** is our quarterly newsletter, helping you choose the right variety and keeping you up to date on topical issues from seedbed preparation to harvesting tips. To sign up for a postal copy of myKWS Maize newsletter, scan the QR code.

For a digital copy, sign up for myKWS at **www.kws-uk.com** (select the maize option).

Getting started with

KWS Maize varieties is easy...

KWS specialises in the production of maize hybrids to suit all growing situations and which cover livestock forage and AD. Our focus is to select varieties capable of consistently achieving top on farm performance in the UK.

Our comprehensive guides are packed with useful information about maximising harvest results. We are also on hand to provide expert advice on varietal choice for individual farm situations — **please do not hesitate to contact us if you require assistance.**

KWS Open Days

KWS has a long-held tradition of opening its Gloucestershire-based Maize Demonstration Site during September, when we welcome growers and merchants to tour the variety plots.

You can learn about our latest trials results as well as benefiting from our expert knowledge and support.

If you wish to visit us in 2022, contact your merchant or get in touch with the KWS maize team; we look forward to seeing you.

We also have a virtual tour of the demonstration site...

KWS Maize360

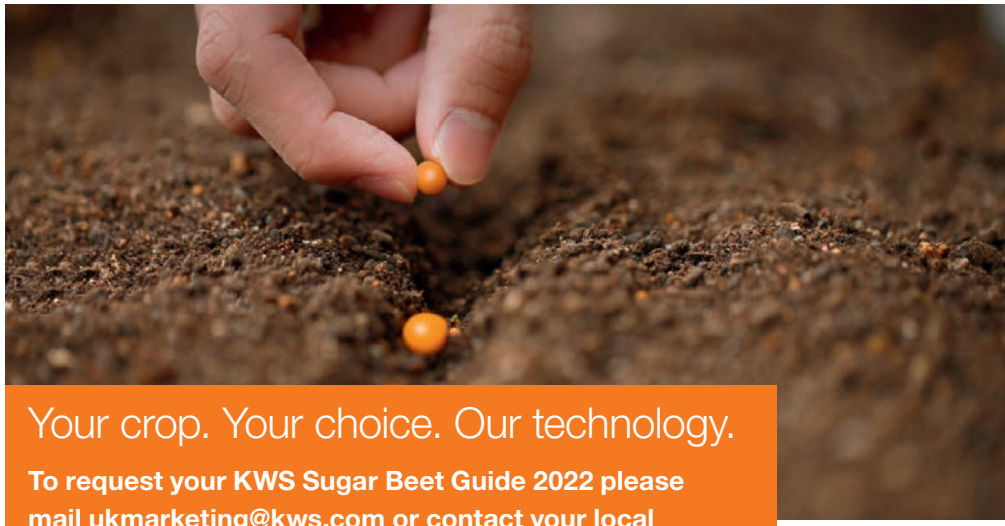
For those who cannot make it in person, we have KWS **Maize360**, which gives a virtual tour of the demonstration site which you can watch from the comfort of your home/office.

You can find the KWS Maize360 tour at www.maize360.com

SUGAR BEET

The best sugar beet for the UK

It's all in the seed



Your crop. Your choice. Our technology.

To request your KWS Sugar Beet Guide 2022 please mail ukmarketing@kws.com or contact your local Sugar Beet Consultant

KWS breeding continues to provide UK growers with exceptional choice for their sugar beet crop, with new varieties added for the 2021 drilling season.

But there's more on offer than just varieties to support you and your crop through the growing season:

CONVISO® SMART
Innovation for excellent weed control

Beet Seed Service
Peace of mind should you need to re-sow

EPD2.0 seed treatment
Giving your seed the best start

POWER at work

CONVISO® SMART – Innovating Weed Control in Sugar Beet

CONVISO® SMART is a revolutionary weed control system for sugar beet growers, providing a step forwards in managing your crops.

SMART KWS seeds
Innovative sugar beet hybrids tolerant to a new ALS-inhibitor based herbicide

CONVISO® ONE herbicide
A new broad-spectrum herbicide in sugar beet based on ALS-inhibitors

SMART CHOICE

More flexible and efficient weed control

- Broad weed spectrum including weed beet
- More independent from growth stage of the beet and growth conditions of the beet
- More independent from weather conditions before and after the application

Find out more at **www.convisosmart.co.uk** or scan the QR code

KWS Beet Seed Service

Your partner if you need to re-sow

The Beet Seed Service is available to all growers of KWS varieties with EPD treated seed.

The decision of re-sowing sugar beet is a last resort, and not a decision to be taken lightly. A wide range of issues can cause an uneconomic plant to stand within the establishing crop such as frost, wind blow and pest damage.

To complement our offer of EPD treated seed for UK growers, we are offering KWS Beet Seed Service to provide peace of mind if re-sowing is necessary.

The Principle of the Beet Seed Service

Should you need to re-sow your beet crop we will offer the replacement seed at 50% of the initial sale price of the seed.

For example, if you were to spend £180 per unit on KWS EPD treated seed and needed to re-sow, the seed cost for re-sowing would be £90 per unit.

How to use the Beet Seed Service

Register for Beet Seed Service by signing up to MyKWS at: **www.kws.com/gb/en/mykws/**

Make sure to register your fields within 14 days of drilling.

- Name, address, contact details
- Field seed is drilled and date of drilling
- Proof of purchase of original seed order (invoice or delivery note) including lot number

If the crop fails to establish to a satisfactory level within 8 weeks of drilling, submit a damage report via the Beet Seed Service Website.

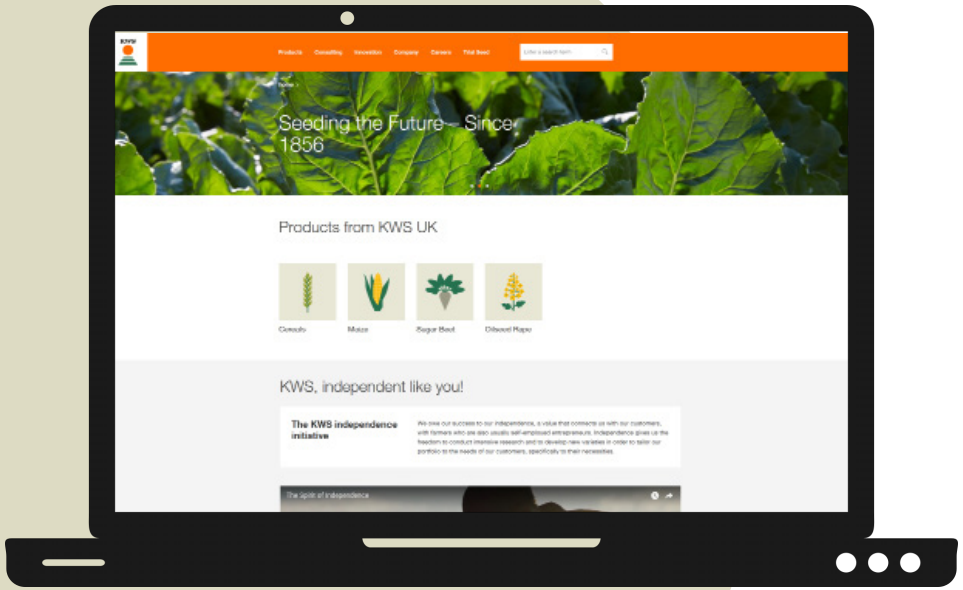
Replacement seed offered to growers through KWS Beet Seed Service must be re-sown in the year it is provided.

Terms and conditions apply - please visit **www.kws-uk.com** for full details.

Want more information?

Visit our website for any additional information you may require on any of our varieties or crops.

The site is easy to navigate, mobile-friendly, nice to look at, AND jam-packed with content!

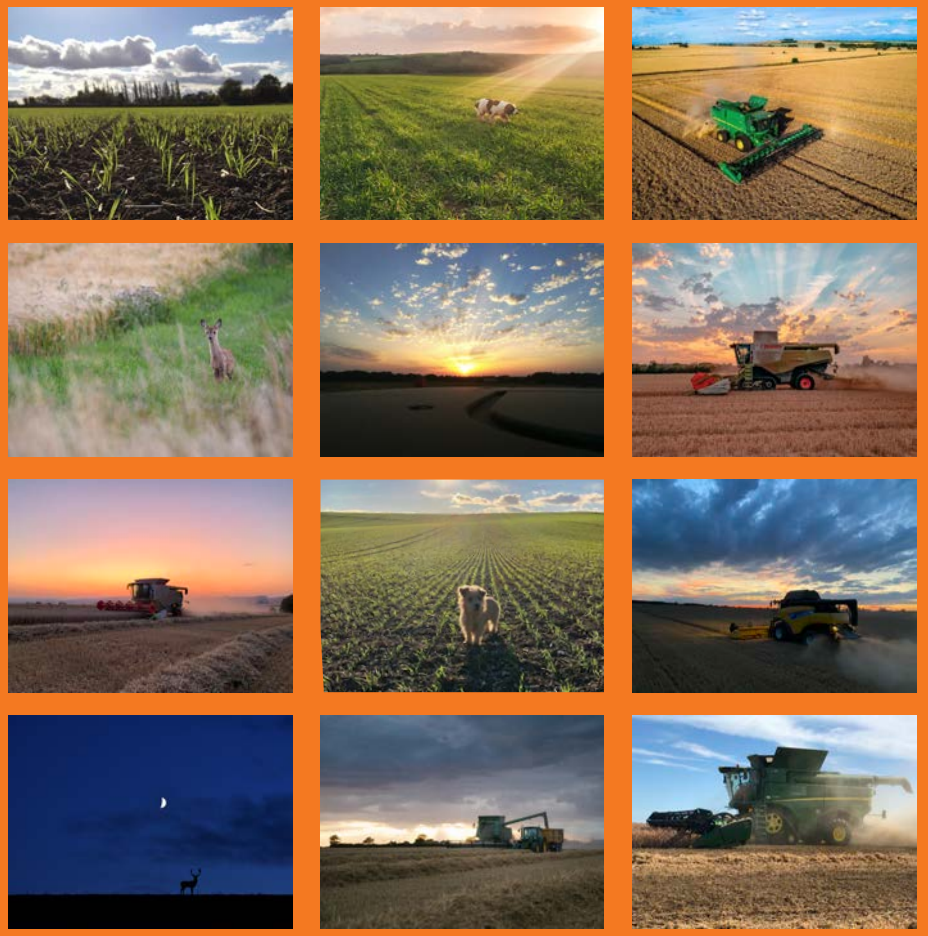


www.kws-uk.com

Follow us on social media and share your stories!

@KWSUKltd @KWSUKLtd @kwsukltd KWS UK Ltd

Here's a selection of some of the great images you have already shared with us



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