



KWS CRANIUM

Growers' Guide

SEEDING
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KWS



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Varietal Characteristics

What makes KWS Cranium different?

The number of varieties growers have to choose from is sometimes daunting. The choices are made a bit smaller if you are growing for a specific quality Group on the Recommended List but as a feed wheat grower you have whole list at your disposal. So, the question is, how do you choose? Our advice is to list the attributes or traits that you require for the specific slot you are choosing for on your farm. Once you have these criteria you will soon whittle the numbers down.

KWS Cranium in a Nutshell

- A feed wheat with incredibly stiff straw and high yields.
- Has a vigorous growth habits which means it excels in the later sowing slots but is perfectly at home competing against blackgrass in the main sowing window.
- The brown rust needs watching but it is nicely offset with strong yellow rust, Septoria and blossom midge resistance.

KWS Cranium, the Ideas Behind the Cross

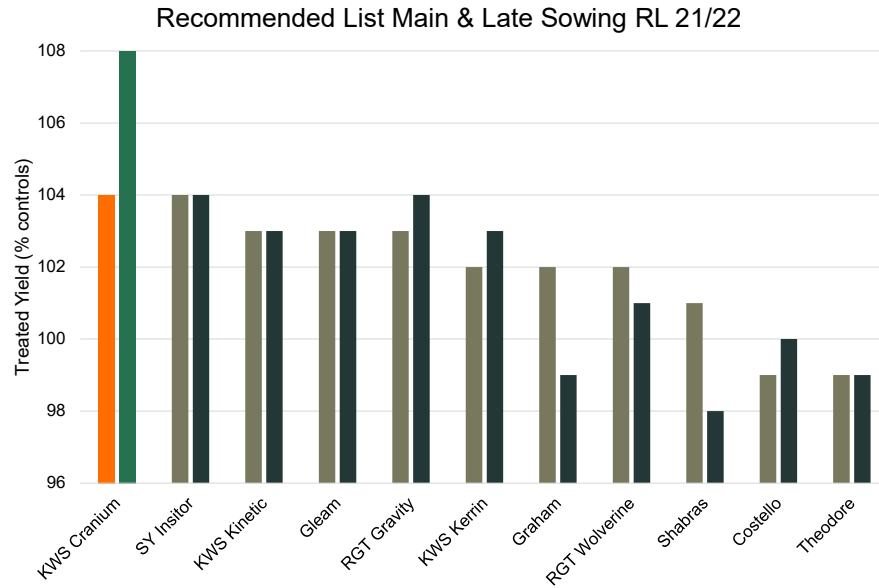
KWS Cranium is, in our eyes the perfect combination of both of its parents KWS Kielder and KWS Crispin.

KWS Crispin	KWS Kielder
KWS Crispin, a Conqueror cross and became known as one of the best varieties for late sowing. A very aggressive growth habit helped it recover in what is normally very adverse conditions or on lighter soils. It was a bit weak strawed and the mildew was on the lower side but it did produce good size ears. Nice grain coupled with good yellow rust and a good level of <i>Septoria</i> at a 6.0.	KWS Kielder was once the highest yielding variety on the Recommended List (RL). The first Oakley cross on to the market came with much expectation until sadly yellow rust intervened. KWS Kielder's main strengths were its tillering and standing ability. It was incredibly aggressive in the number of tillers its produced and so it built yield by grain number. It also performed best on heavy soils and as a second wheat.



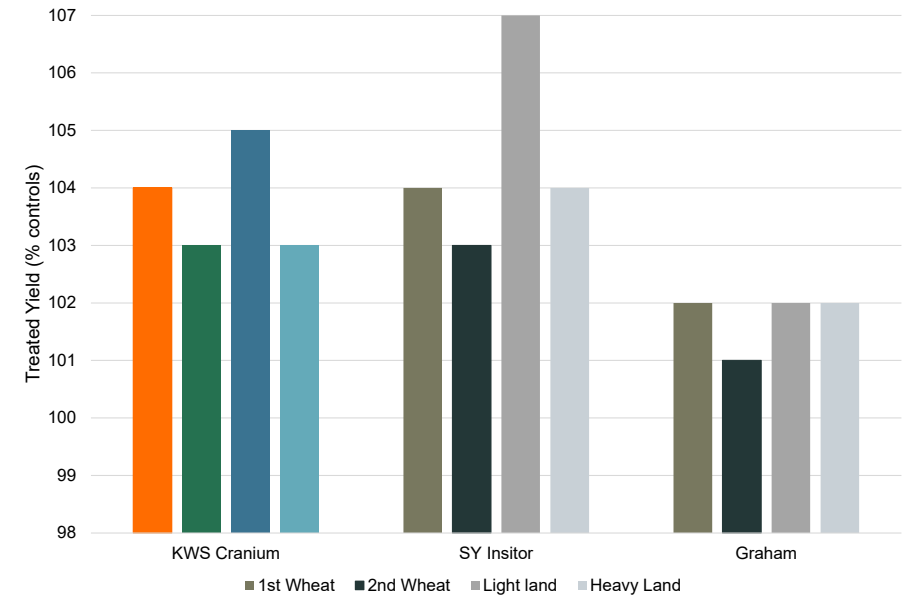
Yield Potential

KWS Cranium is a very high yielding feed wheat from two strong feed wheat parents. The yield level is high in both the main sowing window (end of September- end of October) and in the later sowing position from November onwards. This is ultra-wide sowing window is incredibly useful on farm as changeable weather patterns mean the autumn is unpredictable and more flexibility is needed in the system. What better place to start than with the seed!



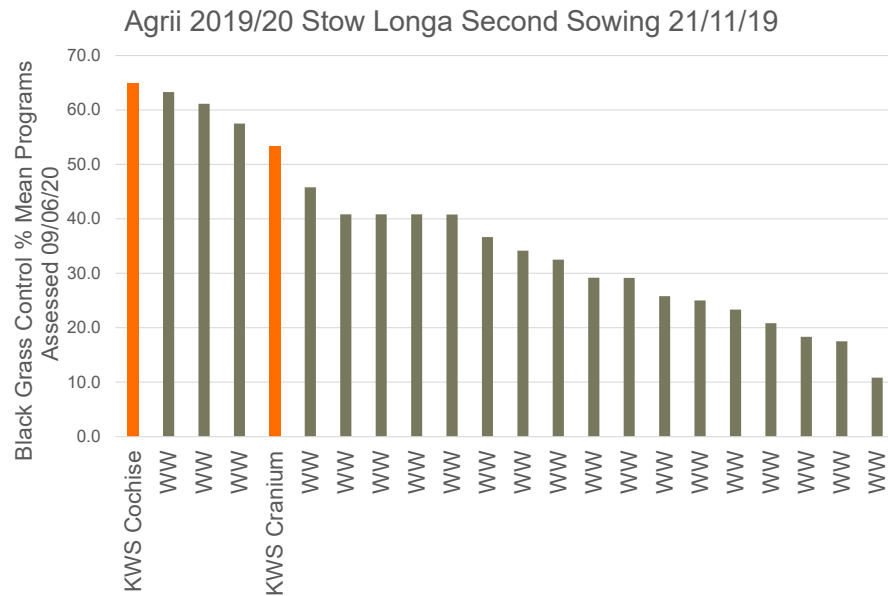
Rotational Potential

KWS Cranium is a rotationally robust variety doing well in every situation. This maximises flexibility and allows land to be sown when it's ready and in good drillable order.



Blackgrass Competition

What is blackgrass competition? We believe there are so many elements to blackgrass competition, big wins come from the sum of the parts, not just one element. When it comes to varietal competition many of the varieties which make it through the National Listing and Recommended Listing system have a certain tillering ability to attain the high yield levels seen in so many trials across the UK in multiple years. Competitive crops, it is estimated can contribute up to 25% black grass control (<https://ahdb.org.uk/wheat-germplasm-for-enhanced-competition-against-black-grass-phd>). There may be some differences between varieties but greater levels exists between crop types, such as barely vs wheat, oats and rye. Management variables play a large part including establishment technique, seed rate, row spacings.



Both parent varieties had good tillering ability indicated by the high yield potential of KWS Kielder. KWS Cranium has a high tillering ability and has shown itself to be a good variety to out-compete blackgr

Regarding spring growth characteristics KWS Cranium is similar to its parent KWS Crispin which was characterised on the Recommended List by showing quick development scores in the development section of the RL.

KWS Cranium is not an erect plant type as KWS Crispin



KWS Cranium vs KWS Crispin
14th April 2020

	Speed of development to growth stage 31 (days +/- average)		
	Early sown (Sept)	Med sown (Oct)	Late sown (Nov)
KWS Crispin	-5	-4	-5
Gleam	[+9]	[+4]	[-3]
RGT Gravity	[+3]	[+4]	[-3]
KWS Kerrin	-2	+2	[-1]
Shabras	+4	+1	[-1]
Graham	+3	+1	-4
Dunston	+5	+2	[+1]
Costello	-1	+0	-3
Evolution	+0	+1	+1
JB Diego	-1	+0	-2

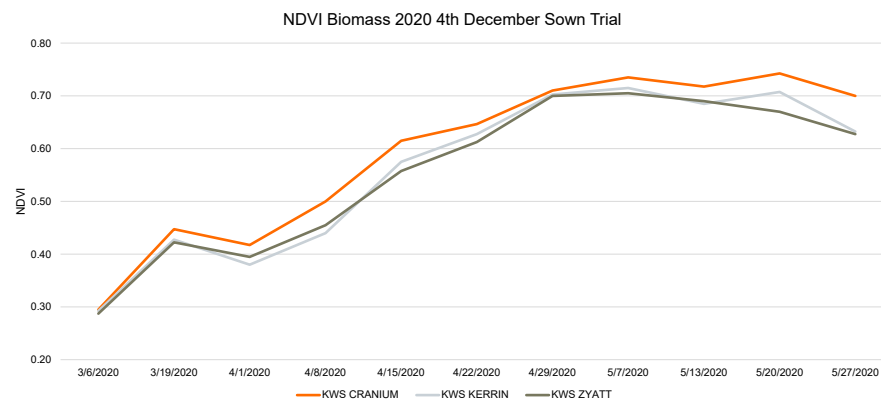
Source: Winter Wheat AHDB Recommended List 2019-20

KWS Cranium keeps the height advantage through the spring.



Recently KWS has been undertaking work to further understanding of canopy development across sowing dates of a range of varieties. We have been recording biomass development through an NDVI (Normalised Difference Vegetation Index) sensor and key growth stages visually.

The chart below compares biomass accumulation of KWS Cranium, KWS Zyatt and KWS Kerrin when sown in early December. At these later sowings the difference between varieties can be more extreme. KWS Kerrin is considered a good vigorous late sown performing variety. The graph shows KWS Cranium increasing its biomass earlier and at a high rate during March and April.



The combination of sowing date and variety can spread the workload across key spray timings. In this trial, across four sowing dates with a 69 day spread and these three varieties there was a spread of 15 days over the T0 period, 16 days over the T1 period and 11 Days over the all important T2 timing. Ear emergence was spread over a 7 days period. If we utilise early and later varieties types combined with sowing timing we can have long spray windows with maximum flexibility built in.

A desk top study conducted by KWS into potential spray windows in looked at Metoffice weather stations recording wind speed in the years 2018 & 2019. Agronomists indicated a T1 work window of approx. 21 days in the eastern counties. The study found that nearly 40% of days in the period 15th April - 5th May have wind speeds with a daily average above 10mph. Sprayer and nozzle technology helps to continue work in more challenging conditions but it highlights how large the risk of loosing an application window is, so why not widen that window with variety scheduling?

Pest and Disease Resistance

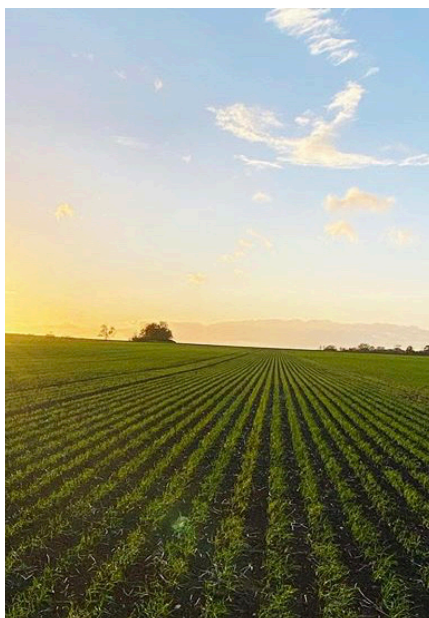
KWS Cranium has a good disease package especially to the most important diseases of yellow rust and *Septoria*.

Mildew and brown rust can be considered its weaknesses, both scoring a 5. Mildew levels can be worse in later sown crops but the score of a five is acceptable and an improvement on its parent KWS Crispin.

Brown rust is not only regional but seasonal. An increasing number of varieties require monitoring for brown rust. Brown rust can be well controlled in a normal farm programme utilising available chemistry groups such as triazoles, SDHI's and strobilurins. If the program is pared back to remove rust active chemistry due to the lower yellow rust risk then the brown rust threat will be increased later season. It may be wise to monitor risk and address this at later spray timings such as T2

	Treated Yield (% treated controls)	Untrt Yield (% treated controls)	Mildew	Yellow Rust	Brown Rust	<i>Septoria tritici</i>	Eyespot	<i>Fusarium</i>	OWBM
KWS Cranium	104	78	5	8	5	6.0	[5]	6	R
Graham	102	87	7	8	5	6.8	3	7	-
SY Instor	104	78	6	5	5	6.8	[5]	7	R

Data Source: 2021/22 AHDB Winter Wheat, Recommended List



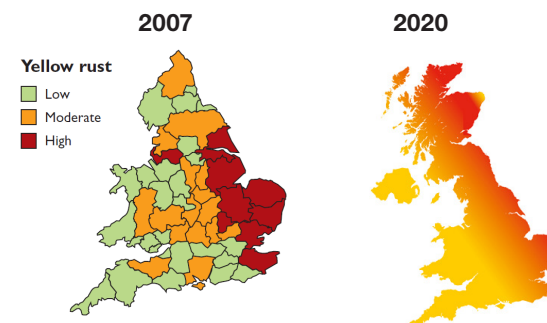
Yellow rust and *Septoria* are the key talking points for disease at the present.

A solid six for *Septoria* is a good place to start and significantly reduces the risk of disease increasing flexibility on fungicide programmes. Couple this with the suitability to later sowings, this score of six increases as the *Septoria* burden decreases.

Septoria was historically considered a greater issue in the wetter West and North. The loss of certain key actives and pressure to protect those that are left means growers need to use a stronger IPM approach.

Like *Septoria* the maps for yellow rust have shifted in recent years.

Incidence of Yellow Rust Across the UK



Data Source: Wheat Disease Management Guide (2007) , AHDB Disease Management (2020)

KWS Cranium has strong yellow rust resistance inherited from parent KWS Crispin. As part of the variety mix on farm variety resistance is still the corner stone of integrated pest management strategies. With greater demand on machinery it's imperative to manage that workload as best as possible. This is where utilising the resistance in KWS Cranium and others offers greater on farm flexibility. Critically earlier spray timings are important for controlling yellow rust before it develops too far.

Grain Quality

The sample is bright and medium sized, similar to parent KWS Crispin. The specific weight listed on the Recommended List is a fair reflection. KWS Cranium is an out and feed wheat with consistent grain which means all specifications for feed wheat. Sprouting data is limited at present but indicates a strong resistance to pre harvest sprouting.

Grain Quality					
	Protein content (%)	Protein content (%) - Milling spec	Hagberg Falling Number	Specific weight (kg/hl)	Resistance to sprouting (1-9)
KWS Cranium	11.3	[11.4]	277	75.4	[6]
SY Instor	11.0	11.4	273	78.4	[5]
Graham	11.5	11.9	279	76.8	6

Data Source: 2021/22 AHDB Winter Wheat, Recommended List

Crop Management Strategies

Sowing Information

KWS Cranium offers an ultra-wide sowing window being very high yielding in both the normal sowing window and the specialist late sowing window. We would recommend sowing from the 1st of October onwards in most situations.

To get the best out of KWS Cranium it should be ideally sown in the mid-end of the drilling schedule. In this position it will do better than all other varieties. Like any good all-rounder it is equally happy in both a first or second cereal position and in light or heavy land soils. Area with high fertility will be able to utilise its very strong straw strength but should not sow too early due to its very vigorous growth habit. This aggressive growth habit also gives KWS Cranium an advantage when grown on light land where its yield is one of the best available.

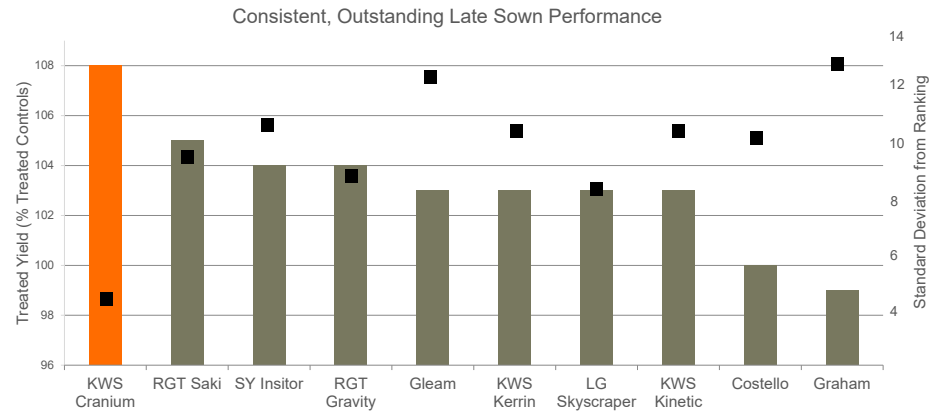
The photographs to the right compare KWS Kerrin on the LHS to KWS Cranium on the RHS, trials sown beginning of October 2019, Cambridge.





Time of Sowing & Seed Rates

KWS Cranium has an extremely wide window of sowing suitability. Unlike most varieties that suffer a yield reduction with later sowing KWS Cranium excels in this positions. For a farmer this gives maximum flexibility around when and where to plant KWS Cranium but also adds yield stability. Delayed sowing is now commonplace as a means to reduce blackgrass, with changing weather patterns this puts added pressure on later autumn sown performance, this is no longer a specialist category but rather more main stream necessity.

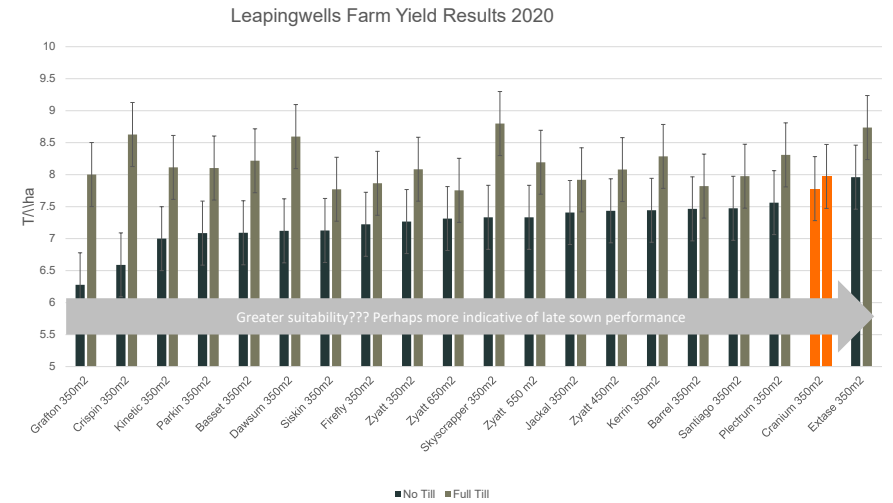


Data Source: 2021/22 AHDB Winter Wheat, 2020 Late Drilled Trials

Standard deviation from ranking is a measure of consistency – the smaller the number e.g. Cranium the more consistent the variety performs across sites and seasons.



KWS has started work exploring the performance of different types of varieties in a full till and no till environments. Year one was the tricky autumn of 2019 so only one trial was unsuccessfully established. The full till on heavy land in Essex established well at 80% of seeds planted. The no till was not as lucky with wet soils open slots, wet straw and slugs all contributed to a much-reduced plant stand of 40% seeds sown. This is one year's work but KWS Cranium performed well in both situations. The results are summarised below:





Crop Nutrition

Nutritional requirements for KWS Cranium will not be significantly different to many other feed wheat varieties grown but any key tips for success will be based around the situation in which the variety is sown. Later sown crops can be less developed than those sown earlier and therefore are not able to access the same amount of nutrients as plants with more extensive root systems. Couple this with the likelihood of more comprising seedbeds there is a good argument for thinking more about early season nutrition availability. However, if you do this the aim would be to provide adequate feed to maintain and strengthen tillers.



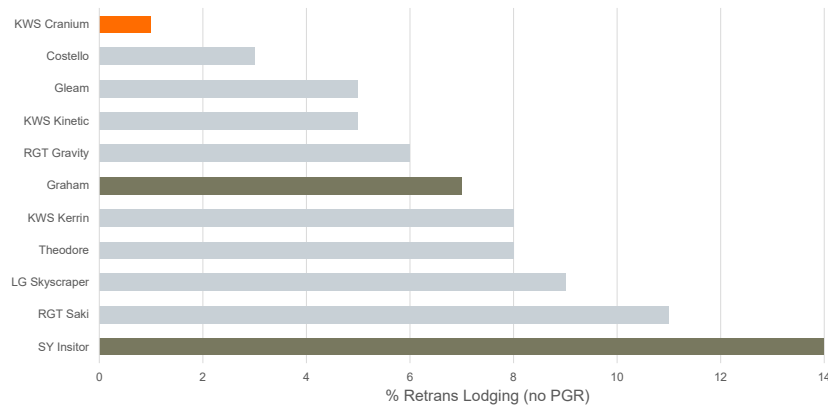
Fertiliser Requirements & Application Timing

Changing weather patterns can present challenges in the growing season, especially periods of dry weather mid spring. This can reduce the viable tiller number and limit yield potential. Later sowing can reduce the biomass and yield potential of crops, these crops may be cleaner from disease but may not be as robust early in the spring. Timing will be key to driving yield forward in late sown crops. Tiller number will be reduced due to reduction in time the plants have to spend tillering. The aims via what ever methods employed should be to feed this tillers which will then produce bigger ears.



PGR Strategy

KWS Cranium is incredibly stiff strawed as illustrated in the chart below:



Data Source: 2021/22 AHDB Winter Wheat, Recommended List

Stiff straw reduces the potential for lodging and yield loss, often a greater issue with fast developing wheats. Stiff straw provides the insurance of standing crop come harvest and fast and efficient harvesting. Very stiff strawed varieties can reduce the need for plant regulation products in line with the low risks. Each input decision will be different depending on drilling date, soil fertility and weather-related lodging risks but with KWS Cranium you have one of the lowest risk varieties available.



Wheat Orange Blossom Bridge

KWS Cranium is OWBM resistant negating the need for a foliar insecticide, so saving money and protecting beneficial insects. Please be aware that the resistance mechanism for OWBM does not work against Lemon Midge. To date no UK wheat variety has genetic resistance to lemon midge and whilst they are not wide spread, they may appear when the boot is splitting. If we have conditions favourable for midge flight around this time it may be worth walking crops and treating if numbers are large.



Harvesting & Storage

As a feed wheat storage is straight forward, it is an out and out feed wheat variety.



Further Information

If you need any further information or advice on growing KWS Cranium, then please email us at: info@kws-uk.com or telephone **01763 207300**.

For more about KWS UK Ltd and our other varieties, please visit our website at: www.kws-uk.com

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