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Understanding triticale

Sarah Clarke[1], Susie Roques[2], Richard Weightman[2] and Daniel Kindred[2]

[1]ADAS Gleadthorpe, Meden Vale, Mansfield, Nottinghamshire NG20 9PD

[2]ADAS Boxworth, Battlegate Road, Boxworth, Cambridgeshire CB23 4NN

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With research partners:

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Introduction

Triticale is a cross between wheat and rye. It was produced to combine the grain qualities of wheat with the low input requirements and hardiness of rye. However, it has had limited take-up in the UK, partly due to it often being seen as a low-yielding crop best suited to poor or marginal soils. Elsewhere, triticale has made a significant impact, notably in Poland where over 1 million hectares are grown with performance comparable to wheat.

There is an increasing awareness that triticale can be a profitable crop, particularly as a second cereal in the rotation. Recognising this potential, two projects were established. Firstly, an Innovate UK project which funded extensive experiments on triticale performance compared to wheat and its role as a feedstock for bioethanol and animal feed. Secondly, an AHDB Cereals & Oilseeds project funded measurements from the Innovate UK experiments in order to understand how triticale achieves its yield.

This research demonstrated the crop’s capability to compete with wheat in terms of yield and profitability, especially as a second cereal. With the current emphasis on sustainability and a support regime encouraging crop diversity under the three-crop rule, the research and on-farm trials reported here demonstrate triticale to be a potentially viable and attractive option for growers.

This report aims to provide further understanding of how triticale can and does perform in trials and on farm, when compared to wheat, and how it achieves its yields. A guide to optimising inputs is included as well as an illustration of gross margins and the potential of triticale as an animal feed and a biofuel feedstock.

Triticale: a high-yielding cereal

At a glance:

- Triticale generally out-yields wheat, especially as a second cereal, where experiments showed an average 8% yield advantage.
- Triticale suffers less from take-all, but is not considered a take-all break.
- The higher yield of triticale comes from a higher biomass throughout the season and more grains per ear.
- Greater straw production of triticale leads to a lower harvest index than wheat.

Triticale has a reputation for being nitrogen (N) efficient and against this background was included in a multi-species GREEN grain experiment in 2007 (PR468, AHDB Cereals & Oilseeds) which looked to develop N-efficient varieties. In this experiment on a deep silt soil in a first cereal position, the average yield of triticale was 9.68 t/ha (with 120 kg N/ha), out-yielding all the wheat varieties by at least 0.5 t/ha.

The results of the GREEN grain project led to further experiments comparing triticale and wheat, funded by breeders, AHDB Cereals & Oilseeds and Innovate UK. First and second cereal experiments were established on a wide range of soil types, from shallow soils to deep silts, over a wide range of sites in East Anglia, Yorkshire and Oxfordshire. The varieties used varied, but most experiments included the triticale varieties Benetto and Grenado and the wheat varieties JB Diego and Beluga. Between 2009 and 2014, a total of 26 experiments comparing triticale and wheat were carried out.

The overall average yield of triticale (best variety in each experiment) for all experiments was 9.64 t/ha, 0.6 t/ha higher than the best wheat variety average. The average triticale advantage was even greater when grown as a second cereal (0.71 t/ha or 8%). However, triticale did not out-yield wheat in all experiments. The triticale advantage ranged from 37% down to -6%, but the triticale yields were the same as, or higher than, the wheat in 20 of the 26 experiments.

Triticale performed well on all soil types tested, with advantages over wheat of up to 20% on clay loams, up to 21% on shallow soils and up to 16% on silts. Neither did there appear to be regional differences, with triticale giving good yields at all sites.

Overall, triticale can generally be expected to out-perform wheat across regions, soil types and seasons. The advantage is particularly marked when growing it as the second cereal in the rotation.

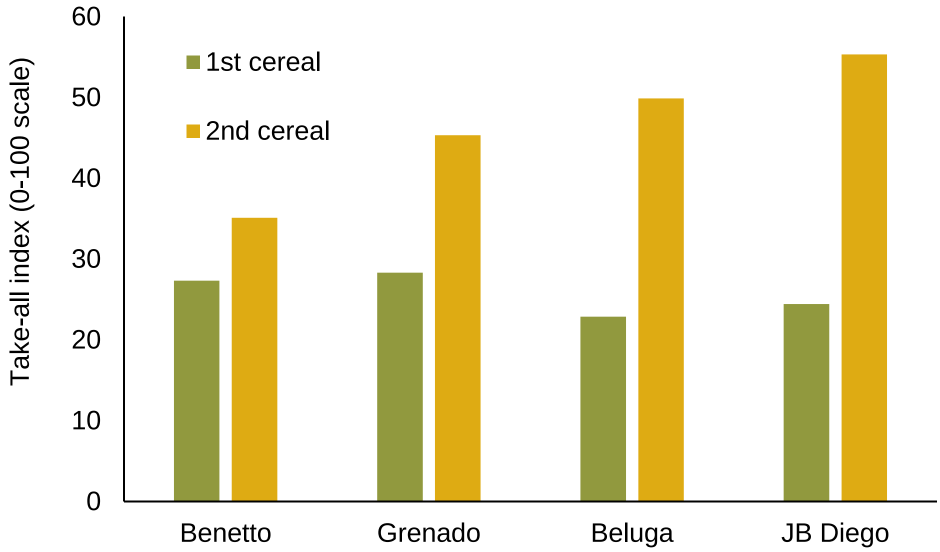
Yields (t/ha @ 85% dry matter) of the best wheat and triticale varieties included in 26 trials carried out between 2009 and 2014 at a range of sites.

Site	Soil	Year	Rotational position	Best wheat variety (t/ha)	Best triticale variety (t/ha)	Triticale advantage
Average				9.04	9.64	7%
Average			1	10.34	10.58	3%
Average			2	8.60	9.31	8%
N. Yorks	Clay loam	2010	1	10.9	11.5	6%
Suffolk	Loam	2011	1	10.8	11	2%
Norfolk	Silt	2011	1	10.1	10.5	4%
Oxon	Clay loam	2011	1	10.2	9.9	–3%
N. Yorks	Sandy clay loam	2012	1	9	9.8	9%
Essex	Sandy clay loam	2012	1	9.8	11	12%
N. Yorks	Sandy clay loam	2013	1	8.56	8.89	4%
N. Yorks	Sandy clay loam	2014	1	9.54	9.30	–3%
Suffolk	Clay loam	2014	1	12.76	13.09	3%
Suffolk	Clay loam	2014	1	11.70	11.85	1%
Suffolk	Clay loam	2009	2	10	12	20%
Suffolk	Clay loam	2010	2	9.5	9.5	0%
Norfolk	Deep silt	2010	2	7.7	8.9	16%
N. Yorks	Shallow	2010	2	9.2	9.4	2%
N. Yorks	Shallow	2011	2	6.3	7.6	21%
Suffolk	Loam	2011	2	8.4	10	19%
N. Yorks	Sandy clay loam	2012	2	6.9	9.4	37%
Cambs	Silty clay loam	2012	2	7.8	9.3	19%
Suffolk	Clay loam	2012	2	10.3	9.7	–6%
N. Yorks	Sandy clay loam	2013	2	8.27	9.04	9%
Essex	Sandy clay loam	2013	2	9.03	8.75	–3%
Cambs	Silty clay loam	2013	2	7.05	7.31	4%
Suffolk	Clay loam	2013	2	10.23	10.20	0%
N. Yorks	Sandy clay loam	2014	2	5.90	6.54	11%
Suffolk	Clay loam	2014	2	11.98	11.66	–3%
Suffolk	Clay loam	2014	2	11.35	11.22	–1%

Triticale in the rotation

The triticale vs wheat experiments clearly showed that triticale gave a greater yield advantage in the second cereal position in the rotation. The main reason for this difference would appear to be take-all.

Opinions differ, but triticale is thought to be either resistant or tolerant to take-all. What is clear is that it suffers less from the disease. The figure below shows results from three experiments comparing take all incidence and severity (combined in a take-all index) in two triticale (Benetto and Grenado) and two wheat varieties (Beluga and JB Diego). The triticale varieties suffered less from take-all than the wheats in the second cereal position.



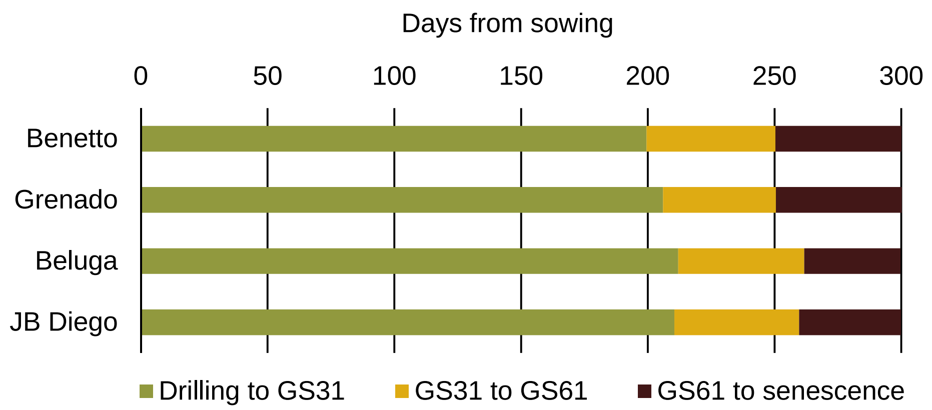
Take-all index (0–100 scale) of two triticale (Benetto and Grenado) and two wheat (Beluga and JB Diego) varieties grown as first and second cereal in three experiments between 2011 and 2014.

It must be remembered that triticale is not deemed as a take-all break, however. Despite lower levels of take-all in triticale, it cannot be considered as resistant.

How triticale forms its yield

The yield results show that triticale usually out-yields wheat, but how does it achieve this? That was the question posed in the AHDB Cereals & Oilseeds-funded project 'Modern triticale crops for increased profitability' (PR556). Detailed measurements were taken from the experiments set up as part of the Innovate UK project in 2012, 2013 and 2014.

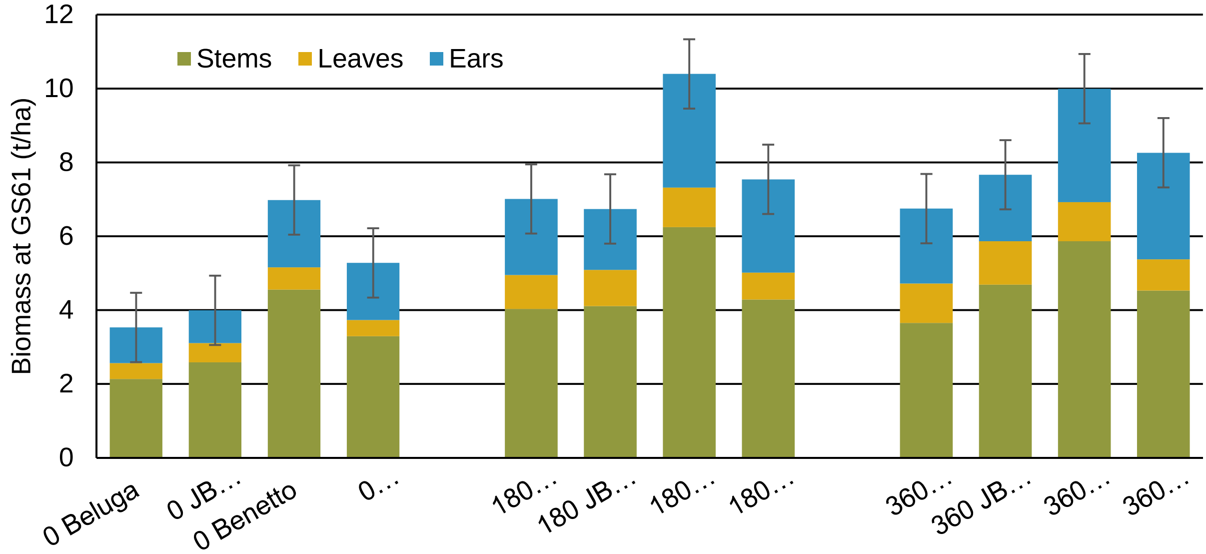
The first noticeable difference between the species was the length of key growth phases. The growth phase from drilling to growth stage (GS) 31 (first node detectable) was, on average, 8.5 days shorter for the triticale, and GS31 to flowering (GS61) 1.75 days shorter than the wheat. The grain filling phase (GS61 to harvest) was considerably (10.6 days) longer in the triticale, though. However, this longer grain filling phase did not confer a greater thousand grain weight (TGW) to the triticale varieties. Instead, this extra time was needed to fill the greater number of grains per ear that triticale has compared to wheat.



Length of key growth phases of two triticale (Benetto, Grenado) and two wheat (Beluga, JB Diego) varieties: Drilling to GS 31; GS31 to GS61; and GS61 to harvest. Results are an average of two experiments. Plots grown at 180 kg N/ha.

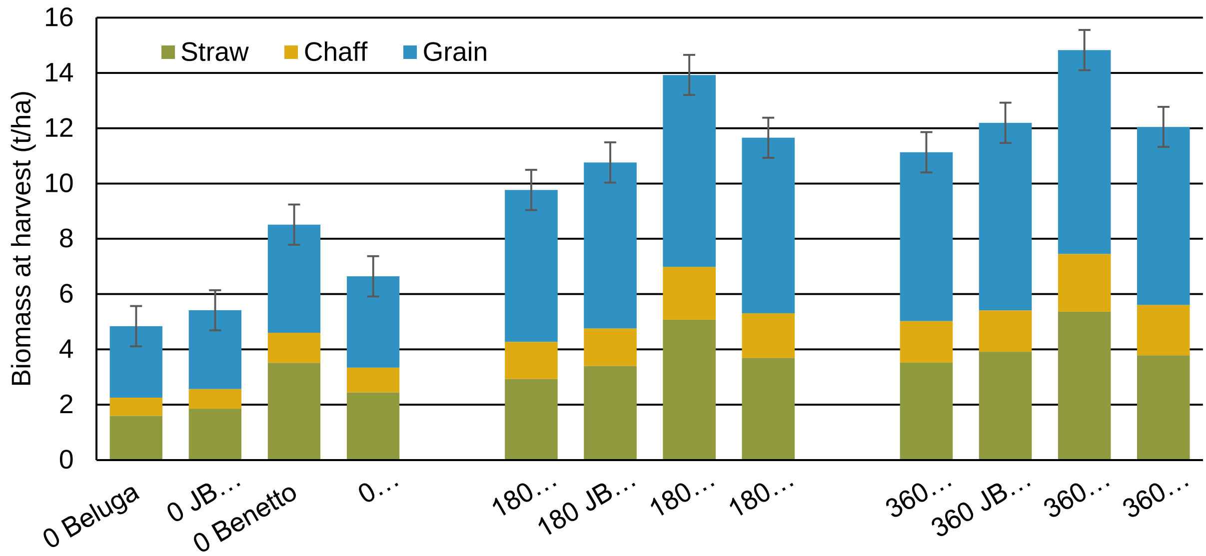
Despite having a shorter duration to flowering, triticale formed more biomass during this phase than wheat. Both triticale varieties formed more biomass than both wheats, but only for Benetto were the increases significant. This was associated with both a greater number of stems and a greater biomass per stem.

A similar pattern was found when green area indices (GAI) and light interception were measured at flowering, although differences weren't significant. At the higher N rates the triticale variety Grenado gave slightly lower GAIs than the wheat.



Biomass at flowering (GS61) of two triticale (Benetto and Grenado) and two wheat (Beluga and JB Diego) varieties grown in three experiments at 0, 180 and 360 kg N/ha. Error bars are SEDs.

The relative differences between the biomass of the different species at GS61 translated into differences at harvest. At the 180 kg N/ha fertiliser rate, triticale variety Benetto gave the highest biomass with more grain, straw and chaff than the other varieties. On average, the triticale varieties gave 0.895 t/ha (@ 100% DM) more grain, but because the weight of straw and chaff was 1.6 t/ha greater than the wheats, the harvest indices of the triticale varieties were lower, which tallies with their taller stature.



Biomass at harvest of two triticale (Benetto and Grenado) and two wheat (Beluga and JB Diego) varieties grown in three experiments at 0, 180 and 360 kg N/ha. Error bars are SEDs.

It can be seen that the yield advantages of triticale come from a combination of a greater number of ears per m^2 and more grains per ear that are filled during a longer grain-filling period. These are supported by greater biomass that is evident throughout the season.

Optimising inputs

At a glance:

- Despite a lower grain price, a greater output and lower input costs mean that triticale gives a greater gross margin (£62/ha at current prices).
- Varieties vary in yield, specific weight and height so, when deciding what to grow, straw requirements should be considered.
- Experiments show the optimum nitrogen rate for triticale is no different to wheat, but it is advised that ~40 kg N/ha less be applied to mitigate the higher lodging risk.
- Most chemicals that are applied to wheat have full or off-label approval for triticale. Some varieties are yellow rust-prone, so rust active triazoles should be applied when required.
- A full PGR programme should be applied to triticale routinely.

Triticale is a good second cereal option and can be grown in the same conditions as wheat. It is known as a 'light land' crop, and although it does well on light soils, the trials described earlier showed that it also out-performs wheat in heavier soil situations and from south to north.

In general, the same inputs can be applied to triticale as to wheat, as most agrochemicals have an EAMU (Extension of Authorisation for Minor Use) for triticale. So, for most growers, a transition between wheat and triticale is simple; drilling date is the same as wheat and harvesting is generally the same as an early wheat. However, there are a number of factors that have to be considered when growing triticale.

Varieties

The small current acreage of triticale grown means that varieties are 'Described' by AHDB Cereals & Oilseeds, rather than 'Recommended' as for wheat. In this system, a number of trials comparing triticale varieties are carried out each season and yield, quality, height and lodging results reported in the AHDB Recommended List publications. However, details found in Recommended Lists, such as disease resistance and regional yields are not reported.

There are eight triticale varieties described in the 2015/16 List (see below). Benetto and Grenado, the varieties used in the trials described earlier, are the oldest of the varieties, although the yields of Benetto remain comparable with most of the other varieties available. It is also one of the tallest of the varieties, but does not suffer from lodging significantly because of its stiff straw. Indeed, despite being taller than most wheat varieties there is little evidence of the varieties in the list lodging, although the lower N rates applied to the trials may also be a contributing factor.

Winter triticale Descriptive List 2015/16

DESCRIBED

	NEW		C		*		C		
	Tradiro	KWS Fido	Benetto	Agostino	Tulus	Toledo	Tribeca	Grenado	Average LSD (5%)
Grain yield as % treated control									
Fungicide-treated (9.0 t/ha)	[111]	111	103	103	102	102	102	97	11.5
Number of trials	6	7	9	9	9	7	9	9	
Agronomic features									
Lodging (%)	[3]	[2]	[2]	[0]	[0]	[0]	[8]	[0]	14.8
Straw length (cm)	[101]	[108]	114	99	103	[98]	118	96	5.5
Ripening (days +/- Benetto, -ve = earlier)	-	[0]	[0]	[0]	[0]	[+2]	[+1]	[+1]	3.1
Grain quality									
Specific weight (kg/hl)	[70.5]	74.7	72.6	75.0	71.3	71.4	71.6	71.3	1.9
Protein content (%)	[10.5]	10.4	10.9	11.2	10.9	10.9	10.7	10.4	0.6
Breeder/UK contact									
Breeder	Lant	Lant	Dank	Lant	Nord	Dank	Desp	Dank	
UK contact	Sen	Sen	Sen	Sen	SU	Sen	Els	Sen	
Status in DL system									
Year first listed	15	14	05	11	12	14	12	08	
DL status	P1	P2	-	-	*	P2	-	-	

Varieties no longer listed: Agrano, Amarillo, Constant and Ragtac

The data in this table are provided for information only and do not constitute a recommendation.

[ ] = limited data
P1 = first year of listing
P2 = second year of listing
C = yield control (for current table)
* = no longer in trial

Dank = Danko, Poland
Desp = Maison Florimund Desprez, France
Els = Elsoms Seeds (www.elsoms.com)
Lant = Lantmannen SW seed BV, Sweden
Nord = Nordsaat, Germany
Sen = Senova (www.senova.uk.com)
SU = Saaten Union UK (www.saaten-union.co.uk)

LSD = least significant difference

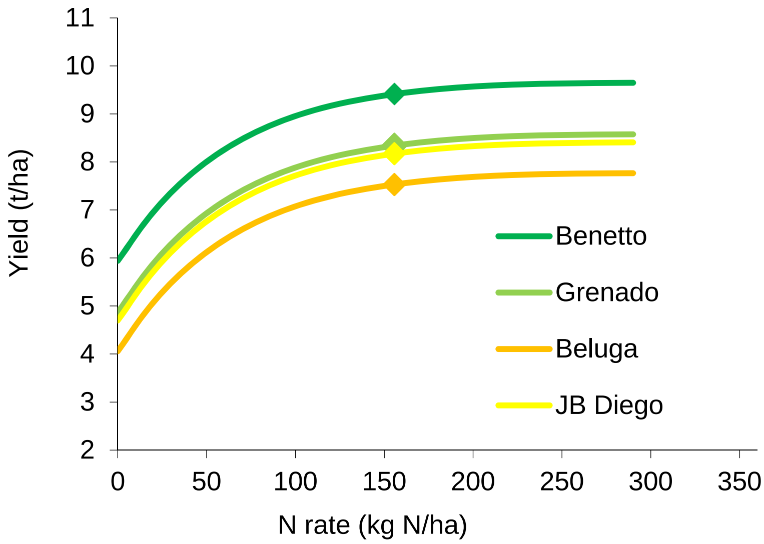
The highest yielding varieties described in the 2015/16 List are KWS Fido and Tradiro; they both have a yield of 111% of the control, representing yields of 10 t/ha, but KWS Fido has the advantage of a higher specific weight (74.7 kg/hl compared to 70.5 kg/hl for Tradiro).

When considering which triticale variety to grow, straw requirements as well as yield and quality should be taken into account. For example, Agostino is a variety with good yields (103% of control) plus the highest specific weight (75 kg/hl) and protein (11.2%) of any triticale variety, but is shorter than most and so will produce less straw.

Nitrogen inputs

Nitrogen is a key input into any cereal, and often the most costly. There are N recommendations for triticale in the Fertiliser Manual (RB209) but the maximum recommended rate is just 150 kg N/ha (SNS Index 0; Mineral soils). As these figures have not been updated recently, this project set out to determine actual optimum N rates using current varieties.

Between 2009 and 2014, sixteen nitrogen response experiments were carried out on wheat and triticale grown as first and second cereals to determine the optimum N rates for each species. The triticale varieties, Benetto and Grenado, were compared with wheat varieties, JB Diego and Beluga, at five or six N rates from 0 kg N/ha to above the likely optimum (> 300 kg N/ha).



Yield response to Nitrogen of triticale (Benetto and Grenado) and wheat (Beluga and JB Diego) varieties grown as a second cereal at ADAS High Mowthorpe (N. Yorks.) showing the optimum N rate (diamonds)

The economic optimum N rates varied between 10 and 220 kg N/ha, depending on the experiment. However, a cross-site analysis revealed that there was no difference in the optimum between triticale and wheat, i.e. to maximise the economic output of triticale, the same amount of N should be applied to triticale as would be applied to wheat in the same situation.

However, due to the slightly increased lodging risk of triticale over wheat, we advise that it may be prudent to slightly reduce the N rate compared to a wheat recommendation, by around 40 kg N/ha. However, based on previous experience and discussions with a FACTS-qualified advisor, N rates could be increased to the same levels as wheat if in conjunction with a robust PGR programme.

Fungicides

As described earlier, triticale is more resistant to take-all than wheat, making it a good second cereal option. Triticale also shows lower levels of septoria tritici than wheat; SDHI fungicides aren’t needed for disease control in triticale but they may confer yield increases.

Many triticale varieties are susceptible to yellow rust and, under certain situations, frequent sprays of rust active triazoles may be required. It can also be beneficial to include strobilurins at the key T1 (GS32) and T2 (GS39) spray timings.

Powdery mildew should also be considered when developing a spray programme for triticale; protectants for mildew should be included as necessary.

The majority of wheat fungicides have either full or off-label approval for use on triticale; exceptions include Cherokee (chlorothalonil + cyproconazole + propiconazole), Firefly (fluoxastrobin + prothioconazole), Flexity (metrafenone), Phoenix (folpet), Proline (prothioconazole), Prosaro (prothioconazole + tebconazole) and Torch (spiroxamine). Check the CRD website for the latest chemical information.

Weed control

Triticale is a more vigorous crop than wheat so offers greater competition against weeds. There is a wide range of broad-leaved herbicides available for use in triticale and the majority of wheat herbicides for grass weeds have either full or off-label approval for use on triticale. Options for black-grass control include products containing flupyrsulfuron-methyl (e.g. Lexus SX, Lexus Class, Unite), Broadway Sunrise (pendimethalin + pyroxsulam), Avadex Excel 15 G (tri-allate) and Topik (clodinafop-propargyl). Products not available for use on triticale include Axial (pinoxaden), Crystal (flufenacet + pendimethalin) and Larke (MCPA). Check the CRD website for the latest chemical information.

PGRs

Generally, triticale is around 20cm taller than wheat and has larger ears. Although triticale varieties generally have stiff straw, their height and ear size means that they are more prone to lodging than wheat. Indeed, some lodging was seen at the very high N rates in the trials described earlier. Therefore, a full PGR programme should be applied routinely to triticale. All main PGRs have full approval for use on triticale or an EAMU. Triticale straw may be at greater risk of brackling after harvest maturity, so it is prudent to not leave triticale crops unharvested for long periods.

How the margins stack up

Maximising gross margins is key when thinking about crop choice. Understanding the financial implications of choosing triticale or wheat as a second cereal should govern the decision-making process and so figures for typical crops are presented here.

The grain yield of the second wheat is the average seen in the UK, and the yield of triticale is based on the average advantage seen over 16 trials (8% yield advantage). The relative grain price is what is typically applied to triticale i.e. a £10/t discount compared to wheat.

Gross margin analysis for a typical wheat and triticale crop grown as a second cereal.

	2nd Wheat	Triticale
Grain yield (t/ha)	*7.5*	*8.1*
Grain price	£130	£120
Grain output (£/ha)	**£975**	**£972**
Straw output (£/ha)	**£140**	**£151**
Variable costs (£/ha)		
Seed & treatment	£70	£70
N fertiliser	£174	£174
Other fertilisers	£80	£86
Fungicides	£100	£70
Insecticides/ herbicides	£70	£70
PGRs	£15	£20
Total variable costs (£/ha)	**£509**	**£455**
Gross margin (£/ha)	£606	£668
Triticale advantage (£/ha)		**£27**

The lower price of triticale means that, although it gives a higher yield, the total grain outputs for the two crops are similar. The improved gross margin of the triticale comes from its higher straw yield and lower cost of inputs.

The table above gives the yield advantage of triticale compared to wheat when the same N rate is applied. If a 40 kg N/ha lower N rate was applied to this example crop, the associated yield would be similar to that of the wheat (7.5 t/ha). As discussed earlier, fungicide costs are generally lower than wheat, and PGR costs higher (See ‘Optimising Inputs’). The difference in the ‘other fertiliser’ category is due to the higher offtake of phosphorous and potassium in triticale which would need to be replaced.

Overall, it can be seen that growing triticale as opposed to a second wheat can make financial sense. The higher yield offsets the lower grain price and, even without the greater straw production, the lower input costs mean a greater gross margin for triticale.

Potential markets

At a glance:

- Triticale grain has useful characteristics to be included in non-ruminant and ruminant feed rations.
- A recent study on pig rations showed triticale gives digestible energy equivalent to wheat and would be a useful addition to a grower or finisher ration.
- Potentially, a large amount of triticale grain could be used for bioethanol production. A sustainability certificate that will allow plants in the UK to accept triticale is imminent.
- Triticale should be considered as an alternative feedstock for AD plants.

Triticale is often harvested as a whole crop for silage and, increasingly, for anaerobic digestion plants, but despite a price that is generally £10/t discount to wheat, farmers often find it difficult to sell triticale grain. However, there are a number of markets to which triticale would be well suited because of its high yields and favourable grain quality characteristics.

Animal feed

Triticale grain has a reputation for being well suited for pig feed due to the high concentration of the amino acid lysine which pigs require. Grain from the experiments described above was analysed for amino acid content and this was confirmed. However, triticale is not often used by compounders in pig rations, partly due to out-of-date reference data on its value as an ingredient.

AHDB Pork commissioned work to address this problem. Digestible energy (DE) was determined using a lab-based methodology and example rations formulated for grower and finisher pigs.

Average values of triticale and wheat nutrient levels (Pig DE and NE are calculated values)

	Protein* (%)	Crude fibre (%)	Starch (%)	Pig DE* (as fed) (MJ/kg)	Pig NE* (as fed) (MJ/kg) calculated
Triticale	9.90	2.2	57.8	14.57	10.35
Wheat	10.30	2.2	60.2	14.59	10.36

*assessments funded by AHDB Pork

Results showed that, on average, triticale had slightly lower protein (0.4% lower) and starch (2.4% lower) levels than wheat. However, pig DE and net energy (NE) were very similar for the two species; DE was 14.57 MJ/kg for triticale and 14.59 MJ/kg for wheat.

When no restrictions were placed on grower (30–60 kg) and finisher (60–100 kg) pig rations, the formulation programme included triticale at ~60% of the ration, the only whole cereal ingredient included. However, compounders could be concerned with including it at this rate due to beta-glucans in the triticale causing digestive upsets.

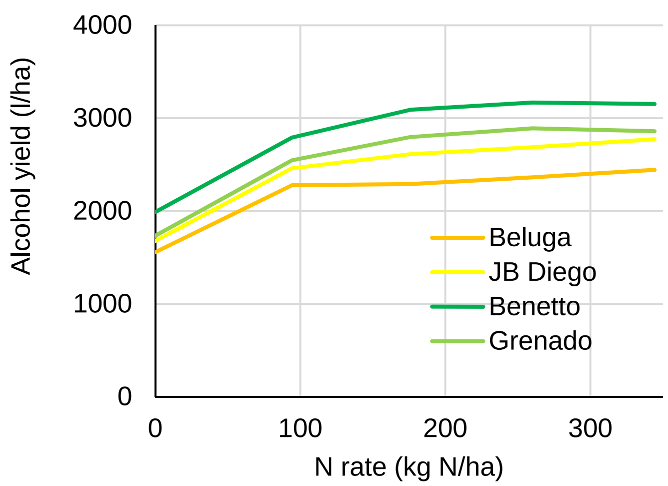
In the scenario of restricting triticale to maximum levels of 20% in grower and 25% in finisher rations, the formulation program included triticale at these maximum levels often resulted in cost savings. Full results from this project can be found in the AHDB Pork report.

Triticale could also be used in poultry rations and for ruminants such as dairy cows. More work is needed to evaluate the value of triticale in these rations, but the positive result of the pig study shows the potential of triticale as a useful feed ingredient.

Bioethanol

The UK bioethanol industry has the potential to take up to 1 million tonnes of grain annually, so work has been carried out to investigate how triticale could feature in this market.

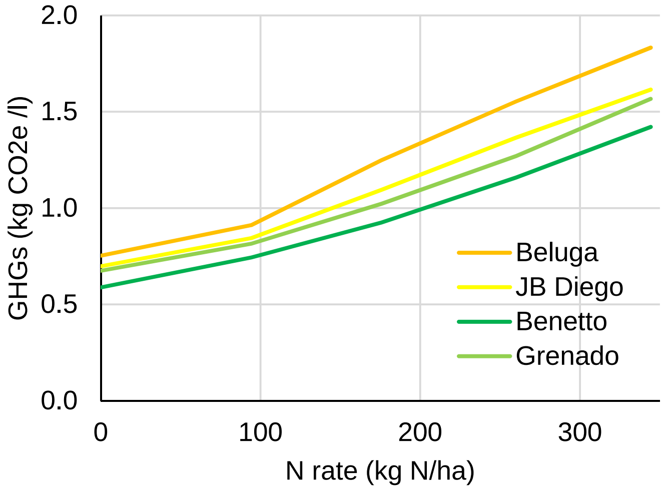
Tests have been carried out on the grain from the experiments described above to determine the alcohol yields of triticale relative to wheat. There is a negative relationship between grain N% and alcohol yield, so low N grain cereals, such as triticale, should work well in the process. Triticale grain does have slightly lower starch concentrations than wheat so the ethanol yields are slightly lower. However, the higher yields of triticale mean that the alcohol yields per hectare are higher than wheat.



Alcohol yield response to Nitrogen of triticale (Benetto & Grenado) and wheat (Beluga & JB Diego) varieties (modelled alcohol yields).

Triticale also has a slightly higher residual viscosity than wheat which can cause equipment through the process to clog up quicker than normal, but if grain was blended with wheat or other grains and appropriate enzymes are used this should not cause any processing issues. The nutritional analysis described above indicated that the DDGS (Dried Distillers Grains and Solubles) created as a by-product of the process would be suitable for animal feed.

In order for bioethanol plants to take triticale grain, a sustainability certificate, which shows the greenhouse gas savings that would be achieved by using triticale, has to be attained. Initial greenhouse gas calculations carried out on the results from the experiments described here do show lower emissions for triticale per litre of bioethanol.



Greenhouse Gas emissions (GHGs) per litre of bioethanol response to Nitrogen of triticale (Benetto & Grenado) and wheat (Beluga & JB Diego) varieties (modelled alcohol yields). Emissions factors are taken from AHDB Cereals & Oilseeds project 'Minimising nitrous oxide intensities of arable crop products (MIN-NO)'. Project Report No. 548

Anaerobic digestion

There is an increasing number of on-farm Anaerobic Digestion (AD) plants; in a report published by the Royal Agricultural Society of England, the NFU stated that they would like to see 1,000 by 2020. Currently, rye is promoted for AD. However, triticale should be considered as an alternative due to its high biomass production and, in some cases, earliness compared to rye. It also has the advantage of lower seed costs than hybrid rye and offers the flexibility of keeping for grain harvest if grain prices become preferable.

The on-farm view

In the 2013/14 season, growers in Staffordshire, Cambridgeshire and Yorkshire planted triticale and wheat side-by-side in the same field to compare their performance under the same management. Fields varied in their soil type from light sands to clays, and the triticale varieties tested differed. In three of the four fields, the triticale out-yielded the wheat, and in the fourth, both species yielded the same. As a results of the trials, one of the farmers is growing 160 acres of triticale because it did so well on some poor land. Two of the growers have shared their experiences.

James and Sam Daw farm near Rugeley, Staffs. They compared triticale on two fields (light and heavy soils) and measured yields using yield mapping and a weighbridge.

On the light-land field, triticale was compared with a breadmaking wheat. Both species were established with the same seed rate (150 kg/ha), but James reported that “the triticale got ahead quicker and was always more advanced” than the wheat.

The triticale received less nitrogen than the wheat; 30 kg N/ha less during the growing season and it did not receive the late 40 kg N/ha designed to increase protein concentration in the wheat. Despite this, the triticale gave higher yields. Weighbridge measurements showed the wheat yielded 5.9 t/ha and the triticale 9.1 t/ha with James commenting “I’ve never seen so much straw”.

Difficult conditions at establishment hampered drilling of the feed wheat and triticale on the heavy land field, but both crops established, albeit not as well as hoped. This was a second cereal situation but there was no take-all evident in the wheat. “If take-all had been a problem in that field you would have seen a bigger advantage of triticale,” says James. When it came to harvest, the triticale again out-yielded the wheat, this time by 0.75 t/ha.

James and Sam found no particular disease problems in the triticale, despite high pressure in the wheat, and they applied the same PGR programme to both species. “The biggest problem was the marketing,” says James. “Because 2014 was such a good season, everyone wanted the grain cheaper so the merchants we spoke to heavily discounted the price of triticale. But we would certainly grow triticale again if the market was right,” he added.

James Robinson farms near Peterborough, and compared triticale (Ragtac) to Relay feed wheat on a clay loam soil as a second cereal.

The wheat and triticale were established using the same methods and drilled at the end of September. The seed rate of the two crops were very similar – around 125 kg/ha. “The triticale got away faster and looked more competitive right the way through the winter,” says James. “It had good ground cover.”

James tested two rates of nitrogen on different areas of the triticale – a standard rate the same as the wheat (220 kg/ha), and a half rate. “The half rate looked a bit thin,” he commented. “If we did it again I think it would be OK to reduce the nitrogen by a quarter. I’d be a bit worried about it falling over if we put the full rate on.”

But the triticale did not suffer from lodging in the trial season. It received the same PGR programme as the wheat which comprised two applications – one in March and one in April.

It also received the same herbicide and fungicide regime as the wheat, and didn’t suffer from any problems. “Relay is susceptible to yellow rust, and there was a bit in the relay but it did not transfer into the triticale,” reported James.

James applied Roundup pre-harvest and combined the triticale a couple of days later than the wheat on the 19th August. “You could feel that there was a lot more going through the combine with the triticale. The volume was there but it didn’t weigh as much as I’d expected – I think it had a low specific weight,” he commented. James also reported that the straw was still quite green at harvest so they weren’t able to bale it as they’d hoped.

Overall, James was happy with how the triticale compared to the wheat. “It was interesting watching it. It didn’t cause me any trouble because I dealt with it like wheat. If it was proven to be good quality for poultry we would use it for our turkeys, and the straw would be useful.”

Where next?

If you're interested in finding out more, there is further information online at AHDB Cereals & Oilseeds or www.triticale.net and there are more details of the experiments described above in the full project report.

If you would like to grow triticale on your farm, it's important to ensure you have an outlet for the grain – either as on-farm feed or someone who will buy it from you. Speak to your grain merchant or to local livestock farms who home-blend. Check with your local seed merchant for available varieties, or the breeder of the variety you are interested in who will be able to point you in the right direction.

Although the current market situation is not ideal there is work ongoing to improve this. A cross-AHDB group will be working with key stakeholders in the grain trade and feed industry to encourage the routine use and acceptance of triticale.

In order to facilitate this, updated reference yield figures for triticale are being collated to be used by defra in official documents. This will help stakeholders to understand what can realistically be achieved when growing triticale.

Other organisations that will be able to provide information and advice include:

- ADAS (Agronomy and Research Findings): enquiries@adas.co.uk
- Senova (Varieties): 01223 890777; info@senova.uk.com
- Saaten Union (Varieties): 01440 783440; enquiries@saaten-union.co.uk
- RAGT Seeds (Varieties): 01799 533700; www.ragtsemences.com
- CF Fertilisers (Nutrition): 0151 3572777; info@cffertilisers.co.uk
- Agrovista (Agronomy): 0115 9390202; www.agrovista.co.uk
- Ensus (Bioethanol production): 01642 794040; www.ensus.co.uk

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