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Technical Managing hybrid rye

Reasons for rye

The UK area of hybrid rye increased 25% this autumn as more growers recognised its agronomic and financial benefits. The crop will be new to many, so *CPM* looks at how to make sure it delivers good results next harvest.

By Paul Spackman & Melanie Jenkins

Across the UK, around 50,000ha of rye went into the ground this autumn, representing a sharp increase on the 38,000-40,000ha sown last year, according to breeder KWS. It predicts the area could double in the next few years.

The surge in popularity is not only driven by market demand, but by the crop's ability to scavenge for water and nutrients in marginal conditions, suppress weed growth and seed return, cope with lower inputs, especially bagged nitrogen, and its powerful soil conditioning effects, thanks to vigorous rooting.

Sowing relatively early in the autumn is the first step in producing a successful crop as this gives plants more time to tiller and establish strong root systems and ground cover going into winter. But maximising the yield potential from modern hybrid varieties, which account for around 90% of the UK area, requires careful management through the rest of the season.

Aggressive rooting

Rye varieties were originally developed for lighter soils, so the crop has an aggressive root system that is very adept at searching out water and nutrients, comments Hutchinsons technical manager Dick Neale.

“Above ground growth can be quite lethargic in autumn, which is why you need to establish it reasonably early. Don't be fooled though, as the plants will still be developing a fantastic root system beneath the surface that will support exceptionally fast growth come the spring.”

KWS maize and hybrid rye product manager John Burgess says slow autumn growth is due to varieties having powerful winter dormancy. But once spring vigour kicks in growth accelerates rapidly, producing up to 20 tillers/plant. This

competitive ability can have valuable benefits for weed suppression and reducing seed return in the summer, he says.

Although rye is traditionally a light land crop, Dick says it can grow well on heavy ground too, where yields of 10.5-12.5 t/ha are achievable given the right conditions and agronomy. The extensive root system also offers excellent soil conditioning benefits, particularly in heavier soils.

However, to maximise the yield potential and the agronomic benefits of rye, growers need to target agronomy carefully to the soil type, growing conditions and quality requirements of end users, he says.

Given rye's strong ability to extract nutrients from the soil, applications of applied fertiliser are generally much lower than for winter wheat.

Less nitrogen

In the case of nitrogen, fertiliser requirement is around 45% less than a second wheat, John says. “That's a big attraction given the sharp increases in nitrogen fertiliser prices experienced this year and may well influence future cropping decisions if prices remain high.”

In practice fertiliser rates in rye may be closer to 120-150kgN/ha, compared with

220-240kgN/ha in a second wheat. However, growers must tailor applications to soil reserves and yield potential, Dick says.

He recommends undertaking N-Min testing in the New Year to assess soil nitrogen levels and predict how much will be available to crops through the spring; information that can then be used to tailor fertiliser applications accordingly. It is generally recommended to split N applications into two or three timings based on growth stage, site, and season.

He notes that rye's ability to extract water and nutrients through its extensive root system means there will be relatively little residual nitrogen left for following crops. "We've seen cover crops after rye looking fairly lacklustre due to the lack of nitrogen, so it's something to bear in mind when planning following crops next season."

There is a similar situation with potassium, although much depends on whether rye is harvested green as wholecrop for AD or allowed to ripen for grain, Dick adds. "Plants don't store potassium, so as they ripen any potassium that's unused is gradually bled back into the soil. Harvesting crops green therefore removes much more potassium than if they're allowed to ripen fully and harvested for grain."

Rye is a relatively tall crop compared with wheat and barley, which inevitably raises concerns about lodging, especially when you add in the rapid spring growth and comparatively large seed heads in high-yielding varieties.

However, breeders have made big improvements to internode strength and reduced the height of modern hybrids, so risks can be easily mitigated with good

nitrogen management and an effective growth regulator programme, says Dick.

He recommends spring PGR applications of products based on trinexapac-ethyl or prohexadione calcium with rates tailored to lodging risk of individual crops — determined by plant population, soil fertility, nitrogen applications, and weather.

As most root anchorage strength develops between growth stages 30-39 this is the best time to apply a robust PGR, John says. Doing so increases the root plate spread, providing better anchorage against root lodging, thicker stem walls and shorter internodes, which reduces plant height, thereby reducing the potential leverage force.

Straw value

While modern hybrids are being selected for their shorter stem lengths and lodging resistance in exchange for a higher harvest index, straw yield remains around 25-30% higher than wheat or barley, representing valuable extra income, he adds. "If you're getting around 4t/ha of straw at £50-100/t, that's potentially another £200-400/ha on top of the grain value."

Dick notes that rye straw can sometimes be difficult to manage, especially in direct drilling situations, so baling may be the best option.

Historically, ergot has been a concern in rye as the crop is a cross-pollinator, which means open flowers are susceptible to infection (wheat and barley self-pollinate). It is a particular risk when there is insufficient pollen around when rye is in flower, as ergot spores will occupy the rye's open flowers causing infection.

Advances in varietal breeding and



Although traditionally a light land crop hybrid rye can do well on heavy ground, yielding 10.5-12.5t/ha given appropriate conditions and agronomy, says Dick Neale of Hutchinsons.

agronomic understanding have significantly reduced ergot risks though. Modern hybrids, such as PollenPlus varieties bred by KWS using the restorer gene Rfp1, produce significantly more pollen, cutting the time needed for fertilisation from several days to hours. This in turn reduces the risk of ergot infection, as once the stigma is closed the ear is no longer vulnerable.

Ergot can still be a risk, especially in sparse crops where there is less pollen available, so growers need to make sure crops are sown thickly enough, Dick says. "Ideally on heavier land you need to establish around 200plants/m²."

Hybrid rye has relatively low susceptibility to eyespot, BYDV and septoria (triticum or ►

Sizing up the rye market

The vast majority (90%) of UK rye is down to hybrid varieties, destined for one of four main markets: whole crop AD, feed grain, flour, and distilling.

Wholecrop rye for biogas production is the biggest sector, accounting for around half of the UK area.

However, with AD development having reached saturation point and very few new plants being built, this market share has declined in the past year, while the feed grain market (principally pig feed) is growing strongly, accounting for around 35% in 2021 and likely to take a greater share in future years.

"With the wheat price at £190-200/t it's very

expensive to feed pigs at that price, so more producers have been looking to include rye as a cheaper alternative," says John. "Rye also offers numerous nutritional benefits."

Feed companies have recognised the advantages of including rye with other cereals in rations and small quantities of feed quality rye are now being traded on both domestic and export markets, according to David Neale, crop markets and seed consultant at Hutchinsons. Most exports have so far been destined for southern Europe, namely Spain and Italy.

"There is an open market for rye, but it's still in its infancy and for relatively small amounts, so it is worth getting a buy-back contract in place,

so you know where you stand," he advises. "There are different options available, so explore the market, especially as contracts may be with buyers you've not dealt with before."

The other main outlets for rye — flour milling for Ryvita and distilling — could offer an alternative option for growers close to particular buyers. However, both markets are relatively small and there is more growth occurring in the animal feed sector, David says.

He also notes the rising trend for artisan breads, wholegrain and mixed seed loaves, which could provide other local opportunities for growers in the right location.



Rye's slow autumn growth stems from its powerful winter dormancy, but come spring growth accelerates rapidly, which can have valuable benefits for weed suppression and reducing seed return in the summer, says John Burgess, KWS hybrid rye product manager.

► nodorum), and is less prone to ramularia than barley, according to John. It is also fairly resistant to take-all.

"Although it's not a true cereal break crop, given the regulatory pressures on existing fungicides, including those responsible for controlling septoria and ramularia, hybrid rye can offer an opportunity for extended rotational control and more diversity in the cereal rotation."

Mildew and rust are the two main diseases to watch out for, especially in

Hybrid rye rotational and management benefits

- Can outperform wheat as a second or third cereal
- Wide drilling window (mid-Sept to early-Nov) spreads autumn workload
- Relatively early harvest (after winter barley, but before wheat) – good entry for OSR (especially if whole-cropped in June)
- Higher straw yield than wheat or barley
- Drought tolerance – 25% lower water requirement than winter wheat according to KWS (300 litres/t of grain versus 400 litres/t for winter wheat) – suits light land or drought-prone areas that may not yield well for wheat or barley
- Competitive against blackgrass – moves through stem elongation faster than other cereals
- Low risk from take-all, septoria, eyespot and BYDV
- Generally requires lower inputs than wheat or barley due to strong root system and natural disease resistance.

dense crops. But generally both can be fairly easily managed providing growers do not let either disease get a foothold, Dick says.

"Treat rye like a yellow rust-susceptible wheat variety and act on any problems as soon as you see them. There are a lot of fungicide options available, but you have to be on your game."

Well-managed rye crops can be a useful component of weed control strategies given the crop's competitive spring growth and shading effect from the extra height.

"It won't be competitive with blackgrass until the spring, which is much like hybrid barley," notes Dick. There is a good range of chemistry available though, including the key residual active, flufenacet, as well as a number of post-em contact herbicides for use in spring, he says.

"Make sure you check labels carefully



Wheat worth £190-200/t is very expensive to feed to pigs, prompting producers to turn to cheaper alternatives, including rye.

though as different products may or may not have approval for use in rye, even though they contain the same active ingredient. For example, some flufenacet-based products have approval, but others don't. ■

Five new rye varieties for 2022

Five new winter rye varieties have landed on the AHDB 2022/23 Descriptive List (DL), bringing with them some impressive yields, grain quality and disease resistance, and giving growers a host of new enticing options in the coming seasons.

KWS Tayo is the obvious standout variety on the new DL, according to Paul Gosling, Recommended List senior manager at AHDB. With a fungicide treated yield at 104% of the control, it's easily the highest yielding variety on the DL.

"With rye, it's hard to be sure which varieties will be grown for grain or for anaerobic digestion and some are for both," explains Paul. "But with its high Hagberg (259 seconds) and protein (9.6%), Tayo is likely to be grown for grain."

It has a 7 for brown rust resistance, based on limited data, matching KWS Serafino. When Serafino joined the DL last year it was the highest yielding variety (102%) and has accounted for the largest production area of

rye in the UK of all varieties on last year's DL.

"Tayo has good lodging resistance — with a very low level of 3% — so I imagine it will catch a lot of the market," adds Paul. However, it does have one of the lower specific weights on the list, at 76.6kg/hl.

Another new addition is **SU Baresi**. It is a high yielder (102%), with reasonable grain quality, and also has potential to secure a good portion of the market, says Paul. "It's not so good on brown rust and lodging as Tayo, but it's still rated a 5 and 14% respectively, which is better than most on the list."

Next up is **SU Bendix**, a lower yielding variety at 99% of control. But it does have good grain quality, with a specific weight of 77.3kg/hl and a protein content of 9.9%. "Some might pick it up for the grain market, but its Hagberg is a bit low (216 seconds) and so is its brown rust score (4)."

Like Bendix, the fourth new addition,

SU Elrond, is a bit light on yield (99%), but does have a trick up its sleeve in its specific weight, which comes in at 78.9kg/hl — the highest on the DL. However, it's difficult to gauge if it will take much market share, according to Paul.

SU Puralis is the final new variety to join the DL this year. A lower yielding variety (97%), it doesn't stack up in terms of overall grain quality or for brown rust (4), but its specific weight comes in at a respectable 77.2kg/hl.

One caveat to note with rye results is the number of trials conducted. "AHDB is increasing the number of trials it has, which will give more of an inclination towards regional variations in varieties, but not to the extent of other crops," explains Paul.

"This year there was a new trial site added in Yorkshire, reflecting information that there was more rye being grown in the North to go into pig rations," he concludes.