Hybrid rye is not your grandfather's rye crop

KWS Daniello is a high yielding hybrid rye with excellent grain quality characteristics.

It may come as a surprise to many growers, but hybrid rye could be the crop they have been looking for. It offers an opportunity to extend the rotation, ease the seasonal workload and save on input costs. There is no need for different machinery and with yields better than what most achieve with a second wheat, business profitability is often improved.

So, what is holding it back? It is typically nervousness about trying something new and bad memories of the crops from years past, but modern hybrids are not the rye crops your grandfather grew.

In the UK, interest in hybrid rye has largely been driven by its performance in anaerobic digestion (AD) plants as it is a useful complement to wastes and other cellulose-based feed stock. As a tall crop (typically 1.5-1.8 metres depending on variety and use of plant growth regulators), the biomass produced easily exceeds that of other cereals and it is not unusual to achieve whole-crop yields of more than 40t/ha.

Domestic rye for home markets

It is its profile as a grain for use in animal rations and human consumption however, that is expected to make it a mainstream cereal. In this respect, the UK trails other countries in Europe and around the world. To meet domestic demand, the UK has relied on imports, principally from Sweden and Germany, but also the Netherlands and Poland. The fall in the value of Sterling since the referendum on the UK's membership of the European Union and concerns over the UK's future trading relationship with the EU have stimulated interest in home-grown supplies.

Across Europe more than 4 million hectares of hybrid rye is planted annually and more than 5 million ha worldwide (including, most recently the USA and Canada for flour and hog feeding). In Germany, Russia, Poland and Denmark, it is a core part of pig rations.

High in lysine, an essential amino acid that influences protein utilisation, and shown to promote higher satiety (the sense of feeling fuller for longer), pigs fed a ration consisting of 30-50% rye have recorded higher growth rates and been seen to exert less aggressive behaviour.

Post-slaughter carcass inspection also found less gut ulceration among those receiving a rye-based ration. This is thought to be due to the higher fructan content of rye which at nearly 60g/kg is almost three times that of wheat and twice that of triticale.

Fructan is a storage carbohydrate digested in the hind gut. It supports butyrate conversion which in turn reduces production of the hormone skatole, which has been linked to boar taint, and leads to lower nitrogen losses in faeces.

Its contribution to finishing fattening pigs is yet to be fully realised in the UK, but this is changing. Feeding trials are investigating its contribution to performance while appreciation of its value to arable enterprises has not gone unnoticed by feed compounders keen to secure large volumes without having to contract growers for production.

The challenge is to marry supply with demand, but once pig finishing units see the benefits this is expected to be resolved quickly. Large units that mill and mix their own rations are expected to be among the early adopters.

Agronomy

Rye is best drilled between 2 to 4cm and while the drilling window spans mid-September through to November, the best performances have been achieved when sown before October at only 200 seeds/m^2.

Yields will vary depending on the land and the season. A 2014 trial in Yorkshire compared hybrid rye directly with a first and second wheat. At 11.6t/ha it out-yielded the first wheat by 0.3t/ha while as

a second cereal it yielded 10t/ha, out-performing the second wheat by 0.7t/ha. This is typical of what KWS see elsewhere and is why many are choosing to grow it as a second cereal instead of wheat or barley.

It can be grown across a range of soil types, but as a deep-rooting, faster growing plant, it is ideally suited to lighter soils or those affected by drought.

Whereas wheat typically needs 400 litres of water per tonne of grain produced per ha, rye uses only 300 litres per tonne of grain.

Hybrid rye also moves through stem elongation faster than any other cereal which has attracted the interest of those with high black-grass populations. By no means the solution, no other cereal is as competitive in this situation.

PollenPlus varieties minimise the opportunity for ergot infection through rapid fertilisation.

Fertiliser and disease management

Management is straight-forward too. Phosphate (P) and Potash (K) needs are broadly similar to winter wheat (under a whole-crop scenario, K needs can be as much as 250kg/ha).

Nitrogen requirements for grain production are typically 140-160kg/ha depending on soil indices. KWS Bono has yielded at up to 13 t/ha with no more than 180kg N/ha.

One area where growers can expect to invest however, is in plant growth regulators and fungicides. On light soils a single PGR is usually sufficient while on loam or clay soils, two applications with one each at GS 31-32 and GS 37-49 are advisable.

Brown rust is the principal disease threat of all rye crops and growers should budget on three applications. In the north, mildew and eyespot should not be overlooked. Other diseases are less of a concern; for example, take-all is negligible as rye is second only to oats for resistance.

Ergot

Aside from inherently higher yields, perhaps the greatest advantage hybrid rye delivers over conventional types is the uniformity of its grain sample and the avoidance of ergot.

Ergot is an historic problem in conventional rye because of the extended flowering period leaving the stigma open to infection before fertilisation occurs.

By contrast, the development of hybrid varieties with the Rfp1 gene (sold as PollenPlus), over-produce pollen, fertilisation occurs is about one-third of the time that it takes in non-hybrid varieties which minimises the opportunity for ergot infection.

Because of the large quantities of pollen produced by PollenPlus grain hybrids such KWS Bono, KWS Daniello and those for biogas, KWS Progas and KWS Propower, the need for a 10% mixture to serve as the male restorer is absent.

This means the all grain produced is of uniform quality, whilst 100% of the seed is hybrid product, further supporting its appeal to feed compounders and food manufacturers and yield progression for farmers.

KWS is focused on increasing the yield of hybrid rye through more grains per ear.

KWS®