Winter Rye

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Teagasc Specialist TILLAGE CROPS REPORT

Teagasc
Agriculture and Food Development Authority

ConnectEd
Professional Knowledge Network

Produced by the Crops Knowledge Transfer Department, Teagasc, Oak Park, Carlow

Background

The area of winter rye in Ireland is low but the crop has attracted some interest in recent years with 1,300 ha grown in 2021 compared to 485 ha in 2020. Rye is not new to Ireland and records show that rye was grown in Ireland in the late 1800's for distilling and the straw was used for thatching. Recent interest in the crop has come in two areas, the distilling industry and feed production for both ruminants and pigs.

Rye is attractive for tillage farmers as it has high grain yields with a relatively low cost of production and is not susceptible to difficult to control disease like septoria tritici and ramularia.

The top countries where winter rye is grown are Germany, Poland, Russia, China and Denmark. Many people point to Denmark, which has a similar temperate climate to Ireland, when making a case for increasing the production of rye in Ireland. Rye production for animal feed in Denmark has increased substantially in recent years as a result of a policy of more home produced feed production where much of the rye grown in Denmark is used for feed in its large pig enterprises.

Most of the current rye varieties are hybrid and are capable of delivering yields between 10 – 12t/ha. Rye is a cross pollinator unlike wheat and barley which are self-pollinators. As a result rye had issues with ergot in the past, but modern breeding techniques have reduced this risk by reducing the time taken for fertilisation to occur.

Rye is highly resistant to the take all fungus gaeumannomyces graminis and is a suitable crop to grow in a take-all slot but consecutive crops should be avoided as this will increase the risk of ergot. One of the advantages of winter rye is that it gives growers the option of lengthening the rotation before returning to a break crop. Another advantage of its take-all tolerance is that it spreads the workload in the autumn as it can be sown from mid-September. Rye also has good nutrient efficiency and good drought tolerance.

Like all cereals rye is susceptible to BYDV and early sowing can also result in increased lodging risk after a growthy autumn so it is important to strike the correct balance between sowing date and location. Rye is very susceptible to slug damage so growers need to be vigilant and treat with an approved molluscicide when thresholds are exceeded.

There are limited pesticide approvals for rye so careful planning of pesticides is required. Consult PCRD website for current pesticide approvals.

Production costs of winter rye are comparable to winter barley but output is higher due to higher grain and straw yields. There are an increasing number of feed merchants purchasing rye but it is important to have an agreement in place before you consider the crop.

Advantages

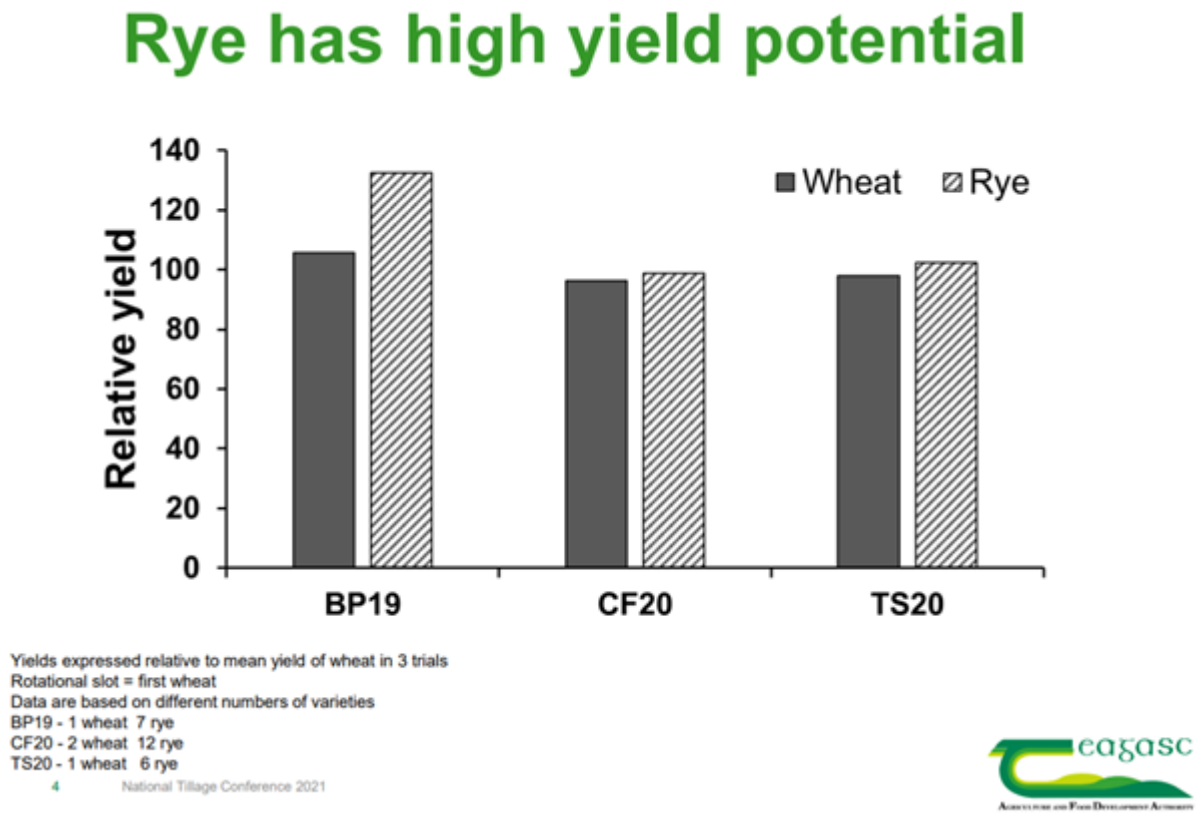
- High yield potential
- Good disease resistance
    - Foliar disease (susceptible to mildew + brown rust)
    - Take-all
- Good nutrient efficiency
- Good drought tolerance
- Spread workload
- High straw yield

Challenges

- Tall crop – lodging needs to be managed
- Market (limited?)

- Limited pesticide approvals
- Ergot
    - Low risk in modern hybrids
- Slug damage
- Limited agronomy research.

Yield



Comparisons to winter wheat in Teagasc Oak Park trials

Varieties and Planting

Rye is best suited for planting at the end of the rotation due to its tolerance of take-all and planting at the end of the rotation also allows volunteers to be controlled in the succeeding break crop. Consecutive rye crops should be avoided due to the risk of build up of ergot.

Rye has a wide range of sowing dates (mid September – November) but needs to be well established before winter dormancy. Earlier sowing results in better establishment and reduces the risk of slug damage but BYDV risk needs to be considered.

Optimum sowing depth is 2 – 3cm, deeper sowing results in reduced tiller production.

Suggested seed rates from KWS for hybrid rye;

- Sept: 175 – 200 seeds /m²
- Oct: 220 – 260 seeds /m²
- Nov: 300 + seeds /m²

Varieties available for 2022 KWS Serafino, KWS Tayo & SU Performer

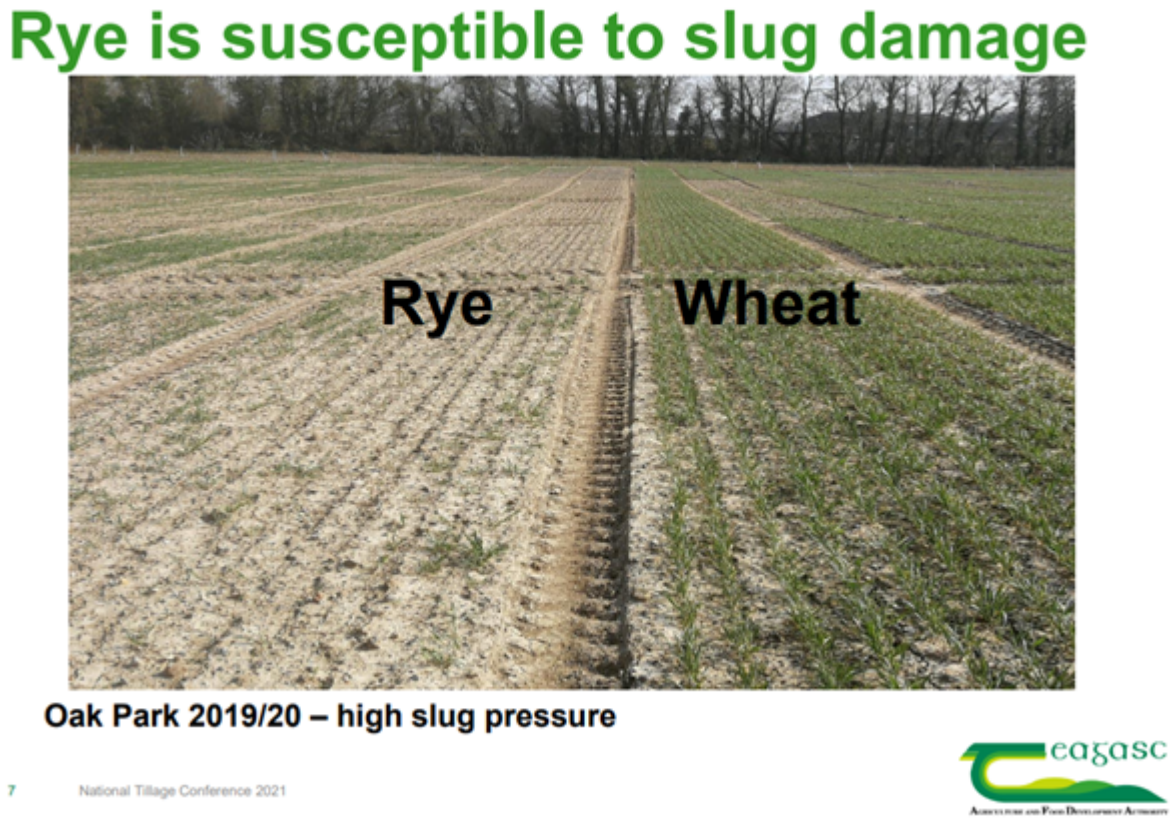
Weed control

Weed control is similar to winter wheat and barley and will normally be done in the autumn. Research from the UK shows that rye does provide useful suppression of blackgrass where light reduction results in reduced maturity and less seeds in blackgrass.

Weed control needs a planned approach as there are fewer herbicides registered for rye than other winter cereals however Pendimethalin, Diflufenican, Flufenacet and Prosulfocarb based products are all approved for rye. Wild oats can be controlled with Broadway Star or Monolith.

Pests

Slugs. Rye is very susceptible to slug damage. Delayed sowing and fields with a history of slug damage increases risk, therefore growers need to be vigilant and treat with an approved molluscicide when thresholds are exceeded.



There isn't any recent research on BYDV in Rye but some older research indicates that Rye is susceptible to BYDV but more resistant than other cereals.

Fertiliser

Nitrogen (N) rate is generally 15 – 20% less than winter wheat.

Phosphorus and potassium application should be based on grain yield and soil fertility levels. P and K offtakes are based on values for oats until more actual crop values become available for Irish growing conditions.

Phosphorus (P) and Potassium (K) kg/ha recommendations for 10t/ha Winter Rye

Index	Straw removed		Straw not removed	
	P[1]	K[1]	P[2]	K[2]
1	58	175	57	77
2	48	160	47	62
3	38	145	37	47
4	0	0	0	0

[1] Increase or decrease P by rate by 3.8kg/ha and K by 14.4kg/ha per tonne increase or decrease in grain yield.

[2] Increase or decrease P by rate by 3.4kg/ha and K by 4.7kg/ha per tonne increase or decrease in grain yield.

Growth regulation

One of the most striking features of winter rye is the height of the crop which is 30 – 40 cm taller than wheat and as a result rye can exert a large leverage force on the stem and root plate. Root lodging is the most common form of lodging and can be an issue especially in thin crops.

Growth stage	Products
29 – 30 and or 31 – 32	CCC +/- Moddus/Medax max
37 – 39	Cerone

Grower experience to date is that losses as a result of lodging are rare but harvesting is slower due to the additional 2- 3 bales (4X4) of straw per acre.

Disease control

Research is ongoing in Ireland but brown rust and powdery mildew are most common diseases but rhynchosporium can affect the lower leaves early in the season. All are well controlled by azole/strobilurins/SDHI mixtures.

AHDB

The main diseases of rye are brown rust, mildew and ergot. However, rhynchosporium, fusarium, eyespot, take-all, and septoria nodorum are also important. The strains of brown rust and mildew that infect rye are not the same ones that cross-infect with wheat or barley. Mildew can cause high yield losses (up to 25%), but is relatively easy to control. Rye undergoes rapid stem elongation and is tall, meaning it can grow away from rhynchosporium infection on the lower leaves, so this is less likely to spread up the canopy than in barley. Ergot tolerance is much higher in hybrid rye than in conventional rye. Rye does not suffer badly from septoria tritici.

To protect against brown rust and mildew, a three-spray programme may be required: T1 (GS29–30), T2 (GS39–47) and T3 (GS51–59). Use a combination of azoles, strobilurins and SDHIs. The T2 timing is the most important: protecting against brown rust late in the season ensures yield and quality is maximised. On biomass crops, the T3 timing is too close to forage harvesting to be economic.

Rye Markets

Recent research on using rye in pig finisher diets in Ireland carried out by Peadar Lawlor, research officer at Teagasc Moorepark, concluded that growth rates were excellent and that rye can be considered a safe ingredient for use in finisher pig diets. Based on the chemical analysis the forecast value of rye in the diet is 94% of the value of wheat.

Rye in growing-finisher pigs – Peadar Lawlor, research officer, Teagasc Moorepark.