Our aim is to develop market opportunities, with farmers, processors and end users - we look forward to working together with you!

Your reading KWS USA new brochure on Hybrid Rye (Secale cereale).

KWS Group is the leading breeder of Hybrid Rye, offering varieties for whole crop (as Forage) or grain production (for feed grain, flour and distilling) with a longterm hybrid breeding program established since the mid 1980’s.

Today Hybrid Rye is grown on over 13.5 million acres worldwide in Europe, Russia, Canada and the United States.

For the North America, KWS believes this highly productive cereal offers new perspectives for farmers and end users alike!

If you have any questions, or would like any further information on our varieties, please do not hesitate to contact us.

(see back page for details)

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In June 2017, KWS filed a patent for the Rfp1 gene, an important restorer gene used in Hybrid Rye.

By incorporating the Rfp1 gene isolated from an ancient Iranian rye landrace in PollenPlus hybrids, KWS Hybrid Rye’s produce immense quantities of pollen. The Rfp1 gene is important because it is the most effective of all restorer genes. With the stigma closed, the ear is no longer vulnerable to ergot infection.

Find out more on the KWS website.
What does Hybrid Rye offer farmers?

Hybrid Rye delivers a range of rotational and management benefits, including:

The yield benefit of hybrid over conventional rye cultivars types has increased to almost 20% since the early 2000’s and by over 45% since the 1980’s – the start of Hybrid Rye breeding activities.

Hybrid rye delivers a range of rotational and management benefits, including:

**High Grain Yields**
Typical yields of 10-13t/ha are commonplace, and many growers have found it out-performs wheat and barley as a second or third cereal. A focus on breeding is delivering yield gains of about 1-2% each season.

**High Straw Yield**
Modern hybrids are being selected for shorter stem lengths in exchange for a higher harvest index, however straw yield remains around 25–30% higher than wheat or barley – a useful additional income on farm.

**Spreads Seasonal Workload**
A fast-growing crop with a long drilling window that spans mid-September through to early November means it can be sown when conditions suit, and time allows. Harvest is typically early too. For grain, maturity falls after winter barley, but before winter wheat making it an attractive choice ahead of oilseed rape. Alternatively, it can be made into whole-crop silage, typically in June.

**Exceptional Drought Tolerance**
A water requirement of around 25% less than wheat or barley of only 79 gal (106 for winter wheat) of water for every 16 bu/acre, makes hybrid rye better suited to light land or drought prone regions.

**High weed competitiveness**
Allelopathy plus Hybrid rye moves through stem elongation faster than any other cereal. Trials have shown that the intense competition of Hybrid Rye against weed reduced the viability of many weed seed by 60% compared with that in wheat.

**Minimal Ergot Risk With PollenPlus®**
KWS Hybrid Rye’s produce immense quantities of pollen cutting the time needed for fertilisation to occur from several days to a matter of hours. The effect of this has been to significantly reduce the risk of ergot infection. Since the introduction in modern hybrids ergot infections has been virtually eliminated. KWS produces only 100% F1 seed to maximise ergot defence.

PollenPlus: The amount of pollen released by PollenPlus hybrids (right) v a competitor Hybrid (left)
Why hybridize Rye?

Although rye is a cereal just as wheat and barley is, there is a significant difference: Rye is a cross-pollinator while wheat and barley are self-pollinators.

During the time, the flower is open it is susceptible to ergot infection. Ergot sporangia over-winter in the field and germinate in the spring leaving the crop vulnerable to infection.

Making rye into a hybrid was the most effective means of addressing this problem. While the process involved is complex, it is less so than in the case of wheat or barley because Rye has a shorter DNA sequence.

By hybridizing rye, KWS was able to influence several important aspects of the crop. First, it was able to rapidly increase yield potential through influencing the number of grains produced per ear to the extent that the yield progression of hybrid rye outstrips that of conventionally bred cereals; and second, it could reduce the risk of ergot infection occurring through a reduction in the time taken for fertilization to occur.
Hybrid Rye - Seed rates & drilling

To get the best establishment with Hybrid Rye - ensure optimum drilling depth when drilling

- 0.8 – 1 inch
- Yield is suppressed at depths < 1.5-2.5 inch

All information about seed lot attached to the tote. Information on weight of one unit will be given on the sheet.

Suggested seed rates:
- Early September 0.7 unit/acre
- Mid September 0.8 unit/acre
- Late September 0.9 unit/acre

In states where frost won’t appear before late Autumn (Nov or Dec) October seeding can also be carried out.

Hybrid Rye - Key rotational advantages:
- High grain yields 100 – 150 bu/acre or more.
- Early harvest (wholecrop) or grain (typically July or early August dep. on region)
- High weed suppression
- High straw yield (around 30% higher than Wheat or Barley)
- Ideal option as a winter cover to prevent leaching of nutrients and also prevent erosion.

Sowing Depth

The seedbed must be firm and clod free to ensure an even drilling depth and even germination.
- Drilling depth must be uniform at a depth approximately equal to 10 times the diameter of the seed being drilled (0.8 inch max).
- Consider trash volumes and depth. The seed needs to be in good contact with the soil.
- Adequate soil cover and consolidation is essential if soil-acting herbicides are to be used.
- Surface tilth should not be too fine. On weak structured soils 'capping' can occur after heavy rainfall.

Make sure the drill is set for the right seeding depth and able to remove possible plant residue from the drill row.

Fertilizer Management

Typical N Application

From numbers of trials across countries the following equation can be used for to calculate the needed amount of Nitrogen

Total N application = expected yield in Bushels x 1.2 minus N-min (N available in soil)

Low rate of total N in lbs/ac 105
High rate of total N in lbs/ac 140
P needs 20-25 lbs/acre
K needs 40-50 lbs/acre
S needs 20-25 lbs/acre applied in spring.
Nitrogen needs to be available very early in the spring as hybrid rye has the highest N uptake between tillering and beginning of elongation.

**Disease Profile**

Hybrid rye is far less susceptible to most leaf diseases compared to other cereals. The most important disease in rye cultivation is brown rust.

**Leaf (brown) Rust**

Rye suffers from a specific strain of brown rust (*Puccinia recondita*) – this strain is not known to cross infect with wheat or barley and rye is not affected by *sp. tritici* or *sp. hordet* either. Despite loss of some active ingredients the fungicide spectrum of products available for leaf rust in rye is very strong; some of the newer SDHI’s available are very effective, providing an alternative to a strobilurin/triazole programme.

When flag leaf emerge, this is the most important time to protect the plant. The disease develops by high temperatures and warm nights causing yield losses by decrease grain weight.

**Fusarium**

Fusarium ear blight is a fungal disease of all cereals, including wheat, barley, oats, rye and triticale and affects both the yield and feeding quality of the harvested grain.

- It is often associated with contamination by mycotoxins and can result in high levels of DON (deoxynivalenol) present in the harvested grain.
- Over several harvests measuring the average DON content in harvested wheat and rye samples in 2017 across Canada and USA, it has been determined that rye has significantly lower DON values compared to wheat.

(see graph)

Survey carried out by KWS Cereals in collaboration with hybrid rye seed dealers.

Fusarium free (left) and infected (right) rye grain.
Direct harvest of hybrid rye – KWS Hybrid Rye has a very stiff straw and high resistance towards lodging.

Harvest

Harvest of hybrid rye takes place from early July till mid August. Direct harvest is preferred in order to produce the best grain quality.

Some advise for harvest:

- Be prepared for harvest as soon as the moisture content is below 18% - it dries down very quickly. Sometimes the straw can still be green in the low part.
- Easy to thresh – ensure gently harvest by slowing down the cylinder speed to max 800 rpm. to avoid broken kernels.
- Make sure to spread avns well behind the combine.
- Dry down the the grain to below 15% right after harvest – be careful not using too high temperature.
- For safe grain storage make sure to blow air through every now and then.

Plant residue handling

To avoid volunteer rye to be a problem in the following crop it will be important to have a strategy for handling the straw and stubble after harvest.

Straw:

- Can be bailed or chopped.
- Hybrid rye produces about 1/3 more straw than wheat.
- When chopped make sure it will be spread in the whole width of the combined area.
- Make sure it is chopped fine in order to break down easier and faster – it will make it easier to establish the following crop.
- Work the stubble afterwards with a straw harrow to make sure all left kernel will fall on the soil surface.
  - This will make the kernels to germinate.
  - Do not make any tillage before all kernel have germinated.

Work the stubble light after harvest on an angle of the combine direction. This will make left kernels falling on the soil surface to germinate.