



HYBRID RYE PRODUCTION GUIDE

Hybrid rye is bred to produce high-yielding rye cereal grain and forage with low incidence of disease. Hybrid rye performs well in drought conditions and on sandy soils and even better on more productive soils. First developed in Germany in 1986, hybrid rye was made commercially available in 1995 and is now widely grown in Europe.

PLANT GROWTH & POLLINATION

Hybrid rye produces eight to 20 tillers per plant and large root systems. Each fall tiller represents a potential head of rye the following spring. Spring tillers can also produce viable seed heads, but are much less productive than fall tillers.

Pollination and Ergot: Hybrid rye has lower incidence of ergot due to more uniform development and flowering. A field of hybrid rye sheds pollen in a very short period of time – in a matter of hours.

In addition, the KWS hybrids are PollenPlus® varieties, which produce more pollen than open-pollinated varieties. You may notice a “dust cloud” of pollen over the field during pollen shed. The hybrid uniformity of flowering and pollen shed reduces potential ergot infection. Once rye flowers are pollinated, they close immediately and are no longer susceptible to ergot spores.

Spring tillers and damaged fall tillers may set heads and pollinate later than the majority of the tillers in a field, increasing their exposure to infection from ergot spores.

INCORPORATING HYBRID RYE INTO YOUR CROP ROTATION

Hybrid rye can follow any crop that allows fairly early planting in September. Hybrid rye performs best with early fall planting following a short-season crop species other than a grass, such as early soybeans, hay, or legume cover crops.

PLANTING

Plant hybrid rye early, evenly, and at an optimum population to allow for maximum fall tillering. With a uniform, dense stand of rye in the spring, few spring tillers will form, minimizing the potential for ergot infection.

Planting date: Plant hybrid rye from September 1 through 21 in southern Minnesota for best tillering and grain yields. Adjust this planting window slightly earlier if north of this region and later if south of this latitude. Plant after fall soil temperatures are below 59°F. Planting too early may increase the possibility of winter kill; later planting will result in reduced grain yields.

Planting Depth: Seed hybrid rye 0.75 to 0.8 inch deep. Rye can emerge from greater depths, but deeper planting will slow fall growth and plant development.

Planting rate: Planting rates for hybrid rye, 800,000 live seeds/A, are lower than those for open-pollinated varieties, because of the hybrid rye's ability to form many more tillers, particularly when planted at the optimum time. Calibrate drills or other seeding tools to deliver the recommended 800,000 live seeds per acre.

Organic hybrid rye seed is not yet available, but conventional seed may be planted on organic acres with your certifier's approval.

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DRILL AND SEEDER CALIBRATION

- Hybrid rye seed from Albert Lea Seed is packaged with 500,000 LIVE seeds per unit. Because germination is never 100% for any seed lot, the total number of seeds per unit will be somewhat larger.
- Hybrid rye seed is packaged with a single unit per bag or a variable number of units in each tote. The weight of a unit of seed is provided on seed tags in pounds for both bags and totes.
- Divide the 500,000 live seeds / unit by the pounds per unit to get the number of live seeds per pound.
- Divide the target seeding rate, 800,000 live seeds /A, by the number of live seeds per pound to get the number of pounds of seed to be planted per acre.
- An even more streamlined method is to multiply the seed unit weight by 1.6.
- Check the pounds needed per acre with your drill seeding chart for an initial setting and adjust seeder.
- Check seed delivery either in the shed or outdoors. Place a tarp under the drill or seeder and advance the drill meters to deliver seed for the equivalent of 1/20th of an acre. Collect seed from tarp and weigh (a kitchen scale works well for this application). Check your seed weight (weighed weight x 20) with your target seeding rate per acre in pounds.
- For your first seeding pass, fill the seeder with only enough seed to plant one or two acres. Plant to empty your seeder and check the pounds of seed delivered to acres planted.
- Check calibration each year, as differing seed sizes from year to year and with different varieties can affect seed flow in your equipment.

Fertility

pH: Rye is more tolerant of lower soil pH levels compared with the other small grains. Hybrid rye performs best at soil pH levels of 5.5 to 7.5.

Phosphorus and Potassium: Crop removal rates for a bushel of rye grain are somewhat lower for phosphorus (P) and comparable for potassium (K) to removal rates per bushel of winter wheat. Because hybrid rye yields are higher than those for wheat, total P and K requirements per acre will be greater for hybrid rye.

Rye grain removes 0.187 pounds of P and 0.256 pounds of K per bushel of yield¹. Additional K is recommended, however, to support the vegetative growth of the crop. Suggested P and K rates are 25 pounds per acre of P and 40-50 pounds per acre of K. Rates should be increased for soils testing lower than in the optimal range.

Nitrogen: Nitrogen (N) requirement is 1.12 pounds per bushel of hybrid rye grain. Apply N credits for soybeans, forage and cover crop legumes, and manure as you would for corn before calculating additional N fertility needs.

For forage yield, apply 100-120 pounds per acre of total N to ensure both high protein and high forage yield. Apply 20 to 40 pounds of N per acre in the fall, with the remainder applied in the spring while the rye is still vegetative and before stem elongation begins. If using manure, apply in the fall to optimize the nitrogen mineralized and available both in the fall and in very early spring.



Harvest & Storage

Hybrid rye may be harvested standing or windrowed, but harvesting the standing crop is preferred to maintain grain quality. Hybrid rye grain contains about 25% moisture at physiological maturity. Combining can begin when grain moisture has dried to 18%.

Hybrid rye dries more quickly in the field than wheat does. Grain dry down in the field from 18% H₂O to 15% can be very quick in warm weather; moisture can easily drop more than 2% H₂O per day. Grain needs to be at 15% moisture for long-term storage. If aeration is possible during the storage period, grain can be stored with up to 16-17% moisture. If harvesting at higher grain moisture levels, the rye can be dried. Drying rye in storage is similar to drying wheat.

¹ <https://plants.usda.gov/npk/NutrientReport>

Hybrid Rye for Grain

Hybrid rye grain for distilling, milling, and feed.



MARKETS FOR HYBRID RYE GRAIN

Rye is used in animal feeds and for food as flour in baked goods, distilled into whiskey, and cooked as whole grain or flaked, similar to oatmeal.

GRAN HYBRID RYE VARIETY SELECTION

The Universities of Minnesota, Wisconsin, Maine, and North Dakota State University evaluate rye varieties at multiple locations across those states. Grain yields for hybrid rye are 40 percent to 100 percent greater than for open-pollinated rye varieties (Table 1).

Albert Lea Seed carries two grain-type hybrid rye varieties that may be harvested for grain, used as silage/hay, or grazed.

KWS Bono Hybrid Winter Rye*

- Highest yields by U of MN in 2016, 2017 & 2018
- Excellent drought tolerance, best dryland variety
- Very large, deep rooted system

KWS Brasetto Hybrid Winter Rye*

- Dramatically higher yields than common varieties
- Very good standing, good fusarium resistance, and low ergot
- Superior grain quality for milling, distilling or feed

* Requires a license agreement. Due to Plant Variety Protection (PVP) law, the seed may not be saved for replanting or sold for seed.

Table 1. Grain yield and plant characteristics for selected grain-type hybrid and open-pollinated winter rye varieties tested at four locations in Minnesota, 2016-2018 (adapted from: 2018 Winter Rye Field Crop Trials Results, University of Minnesota).

	Hybrid Varieties		Open-Pollinated Varieties		
	KWS Bono	KWS Brasetto	Aroostook	Hazlet	ND Dylan
Best Use	Grain	Grain	Cover Crop	Grain, Cover Crop	Grain, Cover Crop
Days to heading ¹	6	7	1	7	6
Plant height ²	1	2	6	4	7
Straw strength ³	1	1	9	4	9
Ergot Susceptibility ⁴	1	1	4	1	2
Test Weight ⁵	1	5	4	1	9
Grain Yield ⁶ (bu/A)	130.0 a	119.4 b	60.9 d	94.2 c	93.7 c

¹ 1-9 earliest to latest heading dates

² 1-9 shortest to tallest

³ 1-9 strongest to weakest

⁴ 1-9 least to most susceptible

⁵ 1-9 heaviest to lightest

⁶ Yields followed by different letters are statistically different at P < 0.10

Full report: https://www.maes.umn.edu/sites/maes.umn.edu/files/2018_winter_rye_final.pdf

Table 2. Grain yield and plant characteristics for two grain-type hybrid winter rye varieties tested at one location in Wisconsin, 2018 (adapted from: 2018 Hybrid Winter Rye Grain Trial Results, University of Wisconsin).

	Height ¹ (inches)	Test Weight (lb/bu)	Grain Yield (bu/A)
KWS Bono	46.3 b	55.2 a	120 ab
KWS Brasetto	45.7 ab	53.9 bc	122 b

¹ Values followed by different letters in each column are statistically different

Full report: <https://coolbean.info/wp-content/uploads/sites/3/2017/10/Rye-grain.pdf>

Hybrid Rye for Forage

HYBRID RYE IN FEED RATIONS

For livestock feed, hybrid rye can replace a portion of the corn in feed rations. Hybrid rye is higher than corn in protein and slightly higher in lysine and phosphorus (Table 3).

Experiments in Europe indicate that the greater dietary fiber in hybrid rye improves gut and overall health in swine. Suggested inclusion rates for hybrid rye in swine diets are: 20% for piglets; 25% for sows; and 30-50% for feeder pigs, increasing with heavier finishing weights.

In dairy rations, rye can be used up to 25% of the grain mix when fed separately from the forage or 40% of the grain in a Total Mixed Ration (TMR).

HYBRID RYE VARIETY SELECTION

Albert Lea Seed carries a high-performing forage hybrid rye variety.

KWS Progas Hybrid Winter Rye*

- Forage type for silage or grazing
- Tall, very high dry matter yields
- More tons and milk/acre than triticale
- Apply 100-120 lbs N per acre
- Whole plant silage
- Harvest at milk stage for best balance of quality and yield
- Very early heading: consider for roll-down rye

* Requires a license agreement. Due to Plant Variety Protection (PVP) law, the seed may not be saved for replanting or sold for seed.

Table 3. Nutritional values for small grains and corn.

	Hybrid rye ¹	Wheat ¹	Barley ¹	Corn ¹	Triticale ²	Oats ²
Dry matter%	90.1	90.0	92.6	87.7	87.1	87.9
	Dry matter basis					
Crude protein	10-11	11.2	11.4	8.7	11.7	11.0
Digestible* lysine %	0.28	0.32	0.36	0.24	---	---
Metabolizable energy, kcal/kg	3,499	3,641	3,342	3,732	---	---
Insoluble dietary fiber %	15.0	11.8	17.8	11.7	---	---
Soluble dietary fiber %	1.9	0.9	2.7	0	---	---
Fat (ether extract) %	1.4	2.1	2.3	3.5	1.5	5.4
Starch %	62.8	63.4	55.9	66.1	67.6	40.6
Phosphorus,%	0.32	0.40	0.29	0.26	0.39	0.36

* Standard ileal digestibility: swine

¹ Source: 2018. Research laboratory, Dr. Hans Stein and Molly McGhee, University of Illinois

² Source: Feedipedia: Animal Feed Resources Information System www.feedipedia.org

Table 4. Forage yields for two forage-type hybrid rye varieties, and Trical 815, a forage-type triticale in Wisconsin, 2018. (Arlington Research Center)

Hybrid	Harvest date and plant growth stage at harvest					
	5/23—heading (5/29 for Trical 815)			6/22—kernel milky ripe		
	CP %	DM (tons/A)	RFQ Relative Feed Quality	CP %	DM (tons/A)	RFQ Relative Feed Quality
KWS Daniello	16.4 a*	2.85 de	139.8 a	6.9 e	5.47 b	100.4 c
KWS Progas	15.3 b	3.05 d	132.3 ab	7.5 de	5.70 ab	110.3 c
KWS Propower	13.8 c	3.00 de	123.3 b	7.1 e	5.84 a	108.8 c
Trical 815	15.9 ab	2.68 e	135.0 ab	8.5 d	4.45 c	98.9 c

* Results within the same column followed by the same letters are statistically the same.

Full report: <https://coolbean.info/wp-content/uploads/sites/3/2017/10/Hybrid-rye-silage.pdf>