

Kentucky Grain Crop Production at a Glance

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 Websites for more information: <http://kygrains.info>; <https://wheatscience.ca.uky.edu/>; <https://kentuckypestnews.wordpress.com/>; <https://cropprotectionnetwork.org/>

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Crop Scientific Name	Standard	Soil Fertility/pH ^a Mehlich III soil test values at which no additional fertilizer is needed; Target and trigger soil pH values	Nitrogen Recommendation ^a	Desired Plant Density Seeding Rate, Pure Live Seed/ac	Seeding Depth (inches)	Seeding Date	Common Timings				Harvest Timing	Acceptable Harvest Losses	Comments
							Fertilizer and Lime	Herbicide	Fungicide	Insecticide			
Barley <i>Hordeum vulgare</i>	Test Weight (lb/bu)	P: > 60 lb/ac K: > 300 lb/ac	Fall N rate: Usually 0, but not more than 40 lb N/ac. Spring N rate: Between 60 and 120 lb N/ac, depending on tillage system and if single or split N application used. Refer to AGR-1, Table 16 for specific rates.	35 plants/sq ft 1,500,000 to 2,000,000 seeds	1-1/2 to 2	Oct 1 to Oct 15	Apply lime 6 months prior to seeding. Apply P and K just prior to or at planting. Fall N not usually needed, but not to exceed 40 lb N/ac if insufficient N carryover. Use split spring N application at Feekes 2-3 followed by Feekes 5 when tillers are too few and when N losses expected.	Feekes 5	Seed Treatment Heading (Feekes 10.5 to 5 days after heading)	Seed Treatment Feekes 5	June 5 to June 15	< 5% of anticipated crop yield 20 kernels/sq ft = 1 bushel of loss/ac	Barley is planted and harvested earlier than wheat. More sensitive to acidic soil than other small grains. Not as winter hardy as wheat. Most barley grown in Kentucky is 6-row and used for animal feed. "Thoroubred" winter 6-row barley is approved by the American Malting Barley Association (AMBA), so farmers often grow it for malting barley (even though it does not always make the cut and is then used as feed barley). Two-row barley, which is grown for malting and distilling, is not as common in Kentucky. In general, a medium maturing cultivar performs best in Kentucky. Yield Conversions: bu/ac x 53.80 = kg/ha kg/ha x 0.0186 = bu/ac
	48	Water pH: Target: 6.4 Lime if < 6.2											
	Moisture (%)	Double cropping with soybean: Take fertilizer P rate recommendation from small grain (AGR-1, Table 18) and fertilizer K rate recommendation from soybean (AGR-1, Table 15) for the fall application. For silage: Additional K fertilizer needed until soil test K > 420 lb/ac (AGR-1, Table 21).											
Canola, Winter <i>Brassica napus</i>	Test Weight (lb/bu)	P: > 60 lb/ac K: > 300 lb/ac	Fall N rate: Usually 0, but not more than 30 lb N/ac. Spring N rate: Between 90 and 120 lb N/ac prior to bolting, ^b depending upon previous crop. Refer to AGR-1, page 15 for specific rates.	5 to 7 plants/sq ft 6 to 9 seeds/sq ft 261,000 to 392,000 seeds	1/2 to 1	Sept 15 to Oct 1	Apply lime 6 months prior to seeding. Apply P and K just prior to or at planting. Fall N not usually needed, but not to exceed 30 lb N/ac if insufficient N carryover.	Pre-plant In spring when active growth begins	Seed Treatment Early to mid bloom stage ^b	Seed Treatment Rosette to early bloom ^b	May 25 to June 15	25 to 50 lb of seed/ac Approximately 65 to 130 seeds/sq ft	To maximize success of canola it must be planted prior to October 1. It requires intensive scouting to ensure insect pests and diseases do not become problematic. Primarily used for cooking oil. Canola refers to low glucosinolate, low erucic acid rapeseed. Yield Conversions: bu/ac x 56.04 = kg/ha kg/ha x 0.0178 = bu/ac
	50	Water pH: Target: 6.4 Lime if < 6.2											
	Moisture (%)	Double cropping with soybean: Take fertilizer P rate recommendation from canola (AGR-1, Table 24) and fertilizer K rate recommendation from soybean (AGR-1, Table 15) for the fall application.											
Corn, Maize <i>Zea mays</i>	Test Weight (lb/bu)	P: > 60 lb/ac K: > 300 lb/ac	Dryland corn N rate: recommendation ranges from 50 to 200 lb N/ac, depending upon previous crop, tillage system used and soil drainage class. Irrigated corn: 175-200 lb N/ac. Refer to AGR-1, Table 12 for specific rates.	24,000 to 36,000 seeds (non-irrigated) 32,000 to 42,000 seeds (irrigated)	1-1/2 to 3	April 1 to May 30	Apply lime 6 months prior to seeding. Apply P and K just prior to or at planting. Band part of P recommendation on low soil test P soils. Split N applications (at-planting; V4-V6) recommended.	Pre-emergence V3 to V5	Seed Treatment VT/R1	Seed Treatment	Sept 15 to Oct 30	< 5% of anticipated crop yield 2 kernels/sq ft = 1 bushel of loss/ac Typically, 1 to 3 kernels/sq ft is acceptable	In general, early maturing hybrids are about 108 to 111 day hybrids; medium maturing hybrids are 112 to 115 day hybrids; and late maturing hybrids are 116 to 120 day hybrids. Banded P reduces P fixation and improves P use efficiency. If insecticide seed treatments are used, early-season insects are usually not a problem. Seeding rate can vary according to soil depth and water-holding capacity. Lower seeding rate with shallower topsoil depth and lower water-holding capacity. Split N application reduces likelihood of N losses and improves N use efficiency. A fungicide application may be needed to manage southern rust through R3. Ears with 400 to 600 kernels typically produce the most yield per acre. Larger ears often indicate too low of a plant population. Yield Conversions: bu/ac x 62.77 = kg/ha kg/ha x 0.0159 = bu/ac
	Shelled 56	Water pH: Target: 6.4 Lime if < 6.2											
	Ear 70	Corn for silage: Additional K fertilizer needed until soil test K > 420 lb/ac (AGR-1, Table 21).											
	Moisture (%)												
Oats, Winter and Spring <i>Avena sativa</i>	Test Weight (lb/bu)	P: > 60 lb/ac K: > 300 lb/ac	Fall N rate: Usually 0, but not more than 40 lb N/ac. Spring N rate: Between 60 and 120 lb N/ac, depending on tillage system and if single or split N application used. Refer to AGR-1, Table 16 for specific rates.	20 to 30 plants/sq ft 870,000 to 1,500,000 seeds	1 to 2	Oct 1 to Oct 15	Apply lime 6 months prior to seeding. Apply P and K just prior to or at planting. Fall N not usually needed, but not to exceed 40 lb N/ac if insufficient N carryover. Use split spring N application at Feekes 2-3 followed by Feekes 5 when tillers are too few and when N losses expected.	Winter Oats: 3 leaf stage up to flag leaf Spring Oats: After 2-leaf stage, but prior to jointing	Seed Treatment	Seed Treatment	July 1 to July 10	< 5% of anticipated crop yield 20 kernels/sq ft = 1 bushel of loss/ac	Winter oats are least winter hardy of small grains. Oats for grain are mostly used on-farm and currently not recommended for commercial production in KY, because the crop does not always survive the winter. Yield Conversions: bu/ac x 35.87 = kg/ha kg/ha x 0.0279 = bu/ac
	32	Water pH: Target: 6.4 Lime if < 6.2											
	Moisture (%)	Double cropping with soybean: Take fertilizer P rate recommendation from small grain (AGR-1, Table 18) and fertilizer K rate recommendation from soybean (AGR-1, Table 15) for the fall application. Oats for silage: Additional K fertilizer needed until soil test K > 420 lb/ac (AGR-1, Table 21).											
Cereal Rye, Winter <i>Secale cereale</i>	Test Weight (lb/bu)	P: > 60 lb/ac K: > 300 lb/ac	Fall N rate: Usually 0, but not more than 40 lb N/ac. Spring N rate: Between 60 and 120 lb N/ac, depending on tillage system and if single or split N application used. Refer to AGR-1, Table 16 for specific rates.	16 to 18 plants/sq ft 700,000 to 800,000 seeds	1 to 2	Oct 1 to Oct 30	Apply lime 6 months prior to seeding. Apply P and K just prior to or at planting. Fall N not usually needed, but not to exceed 40 lb N/ac if insufficient N carryover. Use split spring N application at Feekes 2-3 followed by Feekes 5 when tillers are too few and when N losses expected.	Feekes 5	Seed Treatment Beginning Flowering (Feekes 10.5.1)	Seed Treatment Feekes 5	June 15 to June 30	< 5% of anticipated crop yield 20 kernels/sq ft = 1 bushel of loss/ac	Newer hybrid ryes may be an option for grain production. Historically test weight has been quite low for rye grown in KY. In general, a medium maturing cultivar performs best in Kentucky. Earlier planting appears to be required on rye for grain. Tolerates acidic soil better than other small grains. Yield Conversions: bu/ac x 62.77 = kg/ha kg/ha x 0.0159 = bu/ac
	56	Water pH: Target: 6.4 Lime if < 6.2											
	Moisture (%)	Double cropping with soybean: Take fertilizer P rate recommendation from small grain (AGR-1, Table 18) and fertilizer K rate recommendation from soybean (AGR-1, Table 15) for the fall application. Rye for silage: Additional K fertilizer needed until soil test K > 420 lb/ac (AGR-1, Table 21).											
Sorghum, Grain (Milo) <i>Sorghum bicolor</i>	Test Weight (lb/bu)	P: > 60 lb/ac K: > 300 lb/ac	N rate recommendation: ranges from 50 to 125 lb N/ac, depending upon previous crop. Refer to AGR-1, Table 22 for specific rates.	60,000 plants/ac 60,000 to 80,000 seeds	3/4 to 1-1/4	May 1 to June 10	Apply lime 6 months prior to seeding. Apply P and K just prior to or at planting.	Safener Seed Treatment (such as Concep [®] or Screen). Safener is needed for sorghum receiving pre-emergence applications of S-metholachlor, dimethenamid-P or acetoachlor Pre-emergence 3 leaf stage to 6 leaf stage	Seed Treatment	Seed Treatment	Sept 20 to Oct 20	< 5% of anticipated crop yield 16 to 21 kernels/sq ft = 1 bushel of loss/ac	Plant when soil temperatures are above 60-65°F. Row spacing of 15" or less has less potential for lodging problems than wider row spacings. May need to spray to control sugar cane aphid. Fungicides are available if needed for foliar disease management Yield Conversions: bu/ac x 62.77 = kg/ha kg/ha x 0.0159 = bu/ac
	56	Water pH: Target: 6.4 Lime if < 6.2											
	Moisture (%)												
Soybean <i>Glycine max</i>	Test Weight (lb/bu)	P: > 60 lb/ac K: > 300 lb/ac	None	Full-Season: 100,000 harvested plants/ac 120,000 to 175,000 seeds Double-Crop: 140,000 to 150,000 harvested plants/ac 190,000 to 210,000 seeds	1 to 2	May 1 to July 1	Apply lime 6 months prior to seeding. Apply P and K just prior to or at planting.	Pre-emergence V3 to V6	Seed Treatment Beginning pod development (R3)	Seed Treatment	Sept 15 to Oct 30	5 to 10% of anticipated crop yield 4 seeds/sq ft = 1 bushel of loss/ac	Inoculate with <i>Bradyrhizobium japonicum</i> if field has been out of soybean for 3 to 5 years. If insecticide seed treatments are used, early-season insects are usually no not a problem. Seed size varies by variety. Relative maturity groups of mid-3 to late-4 are best suited for Kentucky. Some late-2 and early-5 can be produced as long as they are planted as early as possible. Increase seed rate for later planting, such as double crop behind wheat, and more challenging environments. Increase seeding rates with shallower topsoil depth. Row widths less than 30 inches provide a yield increase. Yield Conversions: bu/ac x 67.25 = kg/ha kg/ha x 0.0149 = bu/ac
	60	Water pH: Target: 6.4 Lime if < 6.2											
	Moisture (%)	If double cropping with small grain: Take fertilizer P rate recommendation from small grain (AGR-1, Table 18) and fertilizer K rate recommendation from soybean (AGR-1, Table 15).											
Triticale, Winter <i>x Triticosecale</i>	Test Weight (lb/bu)	P: > 60 lb/ac K: > 300 lb/ac	Fall N rate: Usually 0, but not more than 40 lb N/ac. Spring N rate: Between 60 and 120 lb N/ac, depending on tillage system and if single or split N application used. Refer to AGR-1, Table 16 for specific rates.	35 plants/sq ft 1,500,000 to 2,000,000 seeds	1-1/2 to 2	Oct 1 to Oct 30	Apply lime 6 months prior to seeding. Apply P and K just prior to or at planting. Fall N not usually needed, but not to exceed 40 lb N/ac if insufficient N carryover. Use split spring N application at Feekes 2-3 followed by Feekes 5 when tillers are too few and when N losses expected.	Feekes 5	Seed Treatment	Seed Treatment Feekes 5	June 10 to June 25	< 5% of anticipated crop yield 20 kernels/sq ft = 1 bushel of loss/ac	Hybrid between wheat and rye. Use winter varieties. In general, a medium maturing cultivar performs best in Kentucky. Yield Conversions: bu/ac x 53.80 = kg/ha kg/ha x 0.0186 = bu/ac
	48	Water pH: Target: 6.4 Lime if < 6.2											
	Moisture (%)	Double cropping with soybean: Take fertilizer P rate recommendation from small grain (AGR-1, Table 18) and fertilizer K rate recommendation from soybean (AGR-1, Table 15) for the fall application.											
Wheat, Winter <i>Triticum aestivum</i>	Test Weight (lb/bu)	P: > 60 lb/ac K: > 300 lb/ac	Fall N rate: Usually 0, but not more than 40 lb N/ac. Spring N rate: Between 60 and 120 lb N/ac, depending on tillage system and if single or split N application used. Refer to AGR-1, Table 16 for specific rates.	35 plants/sq ft 1,500,000 to 2,000,000 seeds	1-1/2 to 2	Oct 1 to Oct 30	Apply lime 6 months prior to seeding. Apply P and K just prior to or at planting. Fall N not usually needed, but not to exceed 40 lb N/ac if insufficient N carryover. Use split spring N application at Feekes 2-3 followed by Feekes 5 when tillers are too few and when N losses expected.	Pre-emergence Feekes 5 or in spring when active growth begins	Seed Treatment Beginning flowering (Feekes 10.5.1) for management of Fusarium head blight. Earlier applications may be needed in some years to protect against foliar diseases such as stripe rust.	Seed Treatment Feekes 5	June 10 to June 25	< 5% of anticipated crop yield 20 kernels/sq ft = 1 bushel of loss/ac	Winter wheat yields are maximized when row width is around 7". In general, a medium maturing cultivar performs best in Kentucky. Grain can be used for human consumption and animal feed. If insecticide seed treatments are used, early-season insects are usually not a problem. In general, medium maturing cultivars are best suited to maximize profitability of wheat/double crop soybean production system. Yield Conversions: bu/ac x 67.25 = kg/ha kg/ha x 0.0149 = bu/ac
	60	Water pH: Target: 6.4 Lime if < 6.2											
	Moisture (%)	Double cropping with soybean: Take fertilizer P rate recommendation from small grain (AGR-1, Table 18) and fertilizer K rate recommendation from soybean (AGR-1, Table 15) for the fall application.											

^aBased upon recommendations provided in AGR-1 Lime and Nutrient Recommendations.
^bRefer to AGR-227 Identifying Canola Growth Stages.