

UPDATING BARLEY AND RYE MANAGEMENT IN KENTUCKY, YEAR 2

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The boom in distilleries and growing public interest in locally grown foods has combined to generate much interest in barley and rye for Kentucky. These crops have not been studied extensively since intensive wheat management was developed in Kentucky.

In 2016-2017, we investigated seeding rates and nitrogen (N) rates on barley, malting barley and hybrid rye. Seeding rates were 0.5, 0.75, 1.0, 1.25 and 1.5 million seeds per acre. For the seeding rate studies, N rate was set at 90 lb N/A with 30 lb applied at Feekes 3 and 60 applied at Feekes 5. In the winter nitrogen rate study, rates of 0, 30, 60, 90 and 120 lb N per acre were split-applied at Feekes 3 and 5. In addition, all plots

received 30 lb N/A in the fall, consistent with our recommendations when following excellent corn yields. For the nitrogen rate studies, all small grains were seeded at 1.25 million per acre. In 2015-2016, the studies were conducted only at Spindletop Farm near Lexington, KY. For 2016-2017, studies were conducted at Spindletop and at the Research and Education Center at Princeton, KY.

Six-Row Barley (Feed Barley) Seed Rates

Seed rates did not affect yield of feed barley at any tie. Yield averaged over 85 bushels per acre.

**6-Row Barley: Seed rate effect on yield at Lexington
2016, Lexington 2017 and Princeton 2017.**

Seed Rate, Million Seeds/A	Moisture, %	Yield, bu/A
0.50	12.6	92.6
0.75	12.6	85.2
1.00	12.8	88.9
1.25	13.0	89.5
1.50	12.8	91.3
LSD (0.10)	ns	ns

Nitrogen Rates

Yields for feed barley were strong at Lexington with yields above 100 bushels per acre for most nitrogen rates. For Casino barley, nitrogen rate did not influence yield and for Thoroughbred, the two highest N rates had the lowest yields. For Princeton, variety response to nitrogen was similar so yields were analyzed across both varieties. Yield at Princeton 2017 were lower and ranged from about 60 to 79 bushels per acre. Even with the range in yields, differences were not statistically different.

Six-Row Barley:

Nitrogen Rate Effect on Yields for Lexington and Princeton, 2017.

Site	Winter N Rate, lb N/A	Six-Row Barley Varieties							
		Casino		Thoroughbred			Average		
		Moisture, %	Yield, bu/A	Moisture, %	Yield, bu/A	Moisture, %	Yield, bu/A	Moisture, %	Yield, bu/A
LEXINGTON									
2017	0	12.1	122.1	12.1	a 118.9	a	12.1	120.5	
	30	12.0	123.3	12.0	a 124.7	a	12.0	124.0	
	60	12.2	141.0	12.0	a 129.3	a	12.1	135.2	
	90	12.2	133.6	12.0	a 91.2	b	12.1	112.4	
	120	12.2	127.2	11.6	b 84.7	b	11.9	106.0	
	LSD (.10)	0.1	ns	0.2	18.1				
PRINCETON									
2017	0	13.2	29.3	11.0	72.2		11.6	59.9	
	30	14.3	36.9	11.1	86.6		13.1	55.5	
	60	15.0	23.8	11.0	88.4		13.0	56.1	
	90	16.3	29.0	11.0	99.6		13.9	60.4	
	120	15.4	40.7	11.1	116.7		13.2	78.7	
	LSD (.10)						ns	ns	

Yield is adjusted to 13.5% moisture.

Six-Row Barley Conclusions

Seed rates not affecting yields has occurred in other small grain studies before. We had excellent stands and tiller counts at all sites (data not shown). The nitrogen rates are confusing. The 2016-17 season was an unusually warm winter with about five days of freezing temperatures. Damage to barley from the freeze was visually worse at Princeton. The warmer winter could have mineralized more nitrogen. Nitrogen was applied to all plots in the fall at 30 pounds per acre. That rate follows our recommendations when the preceding corn yields were excellent. However, that rate of 30 pounds N per acre plus an unusually warm winter could have resulted in more mineralized N available for plant uptake. For the Lexington 2017 site, the field was minimally tilled before planting the small grains. Prior to that, the field

was in no-tillage for several years. Perhaps that tillage also increased N mineralization.

We would still recommend N fertilizer on barley. We will study barley again this season.

Two-Row Barley (Malting Barley) Seed Rates

Two-row barley yields were above 130 bushels per acre for all seeding rates at Lexington and ranged from about 70 to 100 bushels per acre at Princeton. For both locations seed rates from 0.50 to 1.25 million seeds per acre resulted in yields that were not statistically different. The highest numerical yields were at 0.75 million seeds per acre at Lexington and 1.50 million seeds per acre at Princeton.

Malting Barley:

Seed Rate Effect on Yields and Grain Moisture, Lexington and Princeton, 2017.

Seed Rate, million seeds/A	LEXINGTON 2017		PRINCETON 2017			AVERAGE	
	moisture, %	Yield, bu/A	moisture, %	Yield, bu/A	moisture, %	Yield, bu/A	
0.50	11.9	151.7 ab	11.3	69.7 b	11.6	110.7	
0.75	12.1	159.7 a	10.8	94.1 a	11.4	126.9	
1.00	12.2	148.2 ab	10.8	89.3 a	11.5	118.7	
1.25	12.2	158.6 a	10.6	92.8 a	11.4	125.7	
1.50	12.2	138.8 b	10.8	100.1 a	11.5	119.5	
LSD (0.10)		19.2		11.3	ns		

Nitrogen Rates

Nitrogen rate did not affect yields at Lexington while winter N rates ranging from 60 to 120 pounds N per acre resulted in yields that were not significantly different at Princeton. The highest numerical yields were at 30 pounds N per acre at Lexington and 90 pounds N per acre at Princeton. Both locations had warm winters. Princeton malting barley exhibited more damage from the winter freeze than malting barley at Lexington. Fall applications of 30 pounds N per acre were applied to all plots. Perhaps the fall application of nitrogen and the minimal tillage in the fall helped mineralize more N than we would expect.

Malting Barley:

Winter Nitrogen Rate Effect on Yield and Grain Moisture, Lexington and Princeton, 2017.

Winter N Rate, lb N/A	LEXINGTON 2017		PRINCETON 2017			AVERAGE	
	Moisture, %	Yield, bu/A	Moisture, %	Yield, bu/A	Moisture, %	Yield, bu/A	
0	12.0	135.9	11.2	61.4 c	11.6	98.6	
30	12.0	147.7	10.9	67.0 bc	11.4	107.3	
60	12.0	149.7	11.1	81.0 ab	11.5	115.4	
90	12.1	137.8	11.4	98.1 a	11.8	120.7	
120	12.0	141.3	11.2	89.7 a	11.6	115.5	
LSD (0.10)		ns		3.8	7.8		

In the Fall, 30 lb N/A was applied to all treatments.

Yields adjusted to 13.5% moisture.

Two-Row Barley Conclusions

Seed rates between 0.75 and 1.25 million seeds per acre resulted in the highest yields for both locations. These seed rate ranges are similar to current recommendations for feed barley. The high yields were encouraging. Similar to the feed-row barley, nitrogen rates did not affect grain yield at Lexington. Winter N rates from 60 to 120 pounds per acre resulted in the highest

yields. At Lexington, N rate did not affect yield. See the comments in the previous section about mineralization, warmer weather, etc. Lexington 2017 is most likely an anomaly. We did not observe nitrogen affect any small grain yield trials (barley, rye and wheat) at Lexington 2017. This is not a typical result. We would like to investigate this trial again.

Hybrid Rye Seed Rate

Hybrid rye seeding rate did not affect head counts or yield across all three sites of the study. The average yields were about 80 bushels per acre.

**Hybrid Rye: Seed Rate Effect on Yield Averaged Across
Lexington 2016, Lexington 2017 and Princeton 2017
and Hybrids Brasetto and Guttino.**

Seed Rate, million seeds/A	Heads/ft ²	Yield, bu/A
0.5	65.1	78.4
0.75	69.8	78.6
1	71.7	79.0
1.25	71.3	82.3
1.5	71.6	81.4
LSD (0.10)	ns	ns

Yield adjusted to 13.5% moisture.
Hybrids Brasetto and Guttino tested.

Nitrogen Rate

In 2016, yields were not significantly different for winter applications 60 to 120 pounds N per acre. Yields for these nitrogen rates were significantly greater than yield for the two lower N rates. In 2017, nitrogen rate did not affect yield, similar to all other small grain trials at Lexington 2017.

**Hybrid Rye:
Nitrogen Effect on Yield for Lexington, 2016 and 2017
averaged across hybrids Brasetto and Guttino.**

Winter N Rate, lbs/A	LEX16	LEX17	Average Yield, bu/A
0	39	107	73
30	54	102	78
60	74	102	88
90	86	98	92
120	81	89	85
LSD (0.10)	11	ns	

Yields adjusted to 13.5% moisture.
Hybrids Brasetto and Guttino evaluated.
Fall N was applied at 30 lb N/A on all treatments.

Hybrid Rye Conclusions

The lack of yield response to seed rates is consistent with comments from Germany about growing rye. The yield response to nitrogen in 2016 is consistent with Germany as well, with the exception that nitrogen rates are at times higher than we tested. We plan to modify the protocol to incorporate what we learned from Germany to see if hybrid rye in Kentucky will respond. We appreciate the support of the Small Grain Growers Association.