2016

OHIO FORAGE PERFORMANCE TRIALS

C O N T E N T S:

SUMMARY

This report is a summary of performance data collected from forage variety trials in Ohio during 2016, including commercial varieties of alfalfa, orchardgrass, tall fescue and annual ryegrass in tests planted in 2013 to 2016 across three sites in Ohio: South Charleston, Wooster, and North Baltimore. For more details on forage species and management, see the *Ohio Agronomy Guide*, Ohio State University Extension Bulletin 472, which can be purchased from Ohio State University Extension's eStore at http://estore.osu-extension.org/.

Interpreting Yield Data

Yield data are reported in Tables 2 through 9. Details of establishment and management of each test are listed in footnotes below Tables 3 to 9. Least significant differences (LSD) are listed at the bottom of data columns in Tables 3 through 9. Differences between varieties are significant only if they are equal to or greater than the LSD value. If a given variety yields more than another variety by as much or more than the LSD value, then we are 95% sure that the yield difference is real, with only a 5% probability that the difference is due to chance alone. For example, if variety X is 0.50 ton/acre higher in yield than variety Y, then this difference is statistically significant if the LSD is 0.50 or less.

The CV value or coefficient of variation, listed at the bottom of each table is used as a measure of the precision of the experiment. Lower CV values will generally relate to lower experimental error in the trial. Uncontrollable or unmeasured variations in soil fertility, soil drainage, and other environmental factors contribute to greater experimental error and higher CV values. However, higher CV values can also occur simply as a result of the mean yield being low (eg. due to weather conditions), because the CV is a function of the mean yield. So a higher CV will often occur where yields are low despite there being no increase in experimental error.

Results reported here should be representative of what might occur throughout the state but would be most applicable under environmental and management conditions similar to those of the tests. The relative yields of all forage legume varieties are affected by crop management and by environmental factors including soil type, winter conditions, soil moisture conditions, diseases, and insects.

ALFALFA

Alfalfa has the highest combined yield and quality potential of any adapted perennial forage grown in Ohio. It is grown on about 310,000 acres. Alfalfa requires well-drained soils with near-neutral pH (6.5-7.0). Alfalfa trials are initiated each year and data is collected for at least four years unless the stand becomes so depleted that further testing is no longer worthwhile; variety performance should be evaluated over several sites and years.

Guidelines for Selecting Alfalfa Varieties

To capitalize on alfalfa's potential, select high-yielding varieties with resistance to major diseases. Alfalfa variety rankings for a number of traits described below are reported on the National Alfalfa & Forage Alliance webpage at https://www.alfalfa.org/. Click on the "Education" tab along the top of the page. Consider these factors when selecting alfalfa varieties for Ohio:

1. **Yield.** Yield is critical to profitability of an alfalfa stand. Select varieties with high yields over several locations and years. Table 2 shows this comparison in percent of the average test yield. Varieties that perform equally well across several locations and years are adapted to a wider range of environmental conditions, which is important because soils may vary on your farm and weather conditions vary from year to year.

2. **Persistence.** Another important consideration is how long the alfalfa stand will last. Study variety performance by age of stand to get an estimate of longevity of productivity. Some varieties may decline with age more rapidly than others, which may influence your variety choice depending on how long you intend to keep the stand. For long-term rotations, choose varieties with good disease resistance and good performance in the fourth year. If you plan to harvest alfalfa for three years or less, then high performance during the first three years should be given priority.

3. **Fall dormancy (FD).** Alfalfa varieties with fall dormancy ratings of 1 through 5 are considered adequately winter hardy for Ohio conditions while those of 6 or higher are not considered adapted. Varieties with higher fall dormancy ratings tend to grow at a lower temperature, so they begin growth earlier in the spring and continue growth later into the fall. The fall dormancy rating does not correlate well with winter hardiness within the range of varieties adapted to the Midwest USA.

4. **Disease resistance.** Variety selection based on yield performance alone is less satisfactory than selections that also consider disease resistance characteristics. Resistance to specific disease-causing pathogens may be the most important attribute in an alfalfa variety. Pathogens can dramatically reduce yield and persistence of susceptible varieties. In an evaluation of older versus newer alfalfa varieties we found that newer varieties yielded more and persisted longer than older varieties, primarily because of improved resistance to diseases. For more information on alfalfa diseases, go to http://oardc.osu.edu/ohiofieldcropdisease/t01_pageview2/Home.htm .

5. **Insect resistance.** Alfalfa varieties have been developed for resistance to potato leafhopper (PLH), which is the most consistently damaging insect pest of alfalfa in Ohio. The PLH resistant varieties are not resistant to the alfalfa weevil, and they will need to be protected from that pest like all standard alfalfa varieties when weevil populations exceed the economic action threshold. For more information on these two important pests of alfalfa, see http://ohioline.osu.edu/factsheet/ENT-32 and http://ohioline.osu.edu/factsheet/ENT-33.

6. **Compare to check variety.** For comparisons of varieties across several trials, always compare varieties to the same check variety planted within the trial. The variety Vernal is used as a check in all Ohio trials and is commonly included in trials in other states. Another good way to compare varieties across trials is to look at their yield in relation to the trial average reported in Table 2.

7. **Use good management.** No variety can produce well under poor management. Good management considers all aspects of alfalfa production: seed bed preparation, liming and fertilization, seeding, pest control, harvest, storage, and post-harvest treatment. Many newer varieties are better adapted to intensive management.

Summary of 2016 Crop Conditions

Rainfall was quite variable across the three locations with May thru July being consistently below normal for all three locations. Total rainfall for the growing season was below normal at all three locations. Average monthly temperatures were above normal for most of the year.

Table 1:
Weather 2016

	Wooster		S. Charleston		N. Baltimore	
Month	Total	DFA*	Total	DFA*	Total	DFA*
	Precipitation (inches of rainfall)					
	total	DFA	total	DFA	total	DFA
Apr	2.67	-0.63	2.63	-1.37	3.33	0.03
May	2.52	-1.38	2.87	-1.73	2.17	-1.23
June	1.33	-2.57	1.60	-2.60	2.94	-0.66
July	2.87	-1.23	4.06	-0.04	1.58	-2.22
Aug	3.93	0.33	5.45	1.95	3.05	0.05
Sept	2.37	-0.73	4.84	1.84	4.04	1.34
Oct	3.80	1.50	1.78	-0.52	2.09	-0.21
Total	19.49	-4.71	23.22	-2.47	19.20	-2.90
	Average Daily Temperature (°F)					
Apr	47.7	-0.4	50.9	-0.1	47.4	-1.5
May	59.1	0.6	60.6	-0.7	60.5	0.7
June	70.2	2.6	72.7	2.4	72.1	2.6
July	74.0	2.5	74.7	0.9	75.2	2.4
Aug	74.5	4.6	75.1	3.1	75.0	4.4
Sept	67.1	3.7	68.7	3.5	68.4	4.4
Oct	55.9	3.8	58.1	4.2	57.4	4.9

*DFA = departure from long-term average

Alfalfa

The 2013 seeding at Wooster had the highest yields, averaging 7.21 tons/acre (Table 3) followed closely by the 2014 seeding at S. Charleston at 6.63 tons/acre (Table 4). Lower yields were harvested from the 2015 seeding at N. Baltimore (5.08 tons/acre, Table 5). A new spring seeding at Wooster was seeded on 25-April and three harvests were collected. Insecticide applications were used at all locations for control of potato leafhopper (PLH) and to control alfalfa weevil at South Charleston.

Table 2:

Summary of Alfalfa Variety Performance in Ohio

Standard Trials - Insecticide applied (values are yield as a percent of the trial average)

Variety	Marketers	Wooster 2013-16	Wooster 2016	South Charleston 2014-16	North Baltimore 2016	Total site-yrs	Avg all site yrs
4030	Preferred Seed Company	104				4	104
55Q27	Pioneer		103	102	99	5	102
55V50	Pioneer	104				8	105
55VR06	Pioneer			103	103	4	103
55VR08	Pioneer		91			1	91
55H94	Pioneer	95				8	94
BlueJay	Blue River Hybrids	99				4	99
BlueJay HR	Blue River Hybrids				95	1	95
Caliber	Beck's Hybrids			97	89	12	97
Contender	Beck's Hybrids			99	92	8	97
DBX 303 L	Doebler's PA Hybrids Inc.	105				4	105
DBX 304 HY	Doebler's PA Hybrids Inc.	103				4	103
DBX 305 LH	Doebler's PA Hybrids Inc.	98				4	98
DG 4210	Crop Protection Service	100				12	100
Enduro Elite	The Cisco Companies			96		3	96
Fierce	Beck's Hybrids			97	94	4	97
FSG 403 LR	Farm Science Genetics	105		104		7	104
FSG 424	Farm Science Genetics	98		99		7	98
FSG 426	Farm Science Genetics				105	1	105
FSG 524	Farm Science Genetics	96		99		7	97
GA-497-HD	Preferred Alfalfa Genetics		114			1	114
KF 406 A2	Byron Seeds		105			1	105
KF 425 HD	Byron Seeds		106			1	106
L-455 HD	Legacy Seed	97		98		7	98
Lightning Bolt	Preferred Seed Company		98			1	98
Mallard 5	Blue River Hybrids				104	1	104
Mariner IV	Allied Seed			109		7	106
Persist III	Doeblers PA Hybrids	106	104	102	104	9	104
Pluss III	Doeblers PA Hybrids		97		100	2	98
Prolific II	Doeblers PA Hybrids	106				4	106
Red Falcon	Blue River Hybrids				97	1	97
Rebound 6XT	Croplan Genetics		100			1	100
Roadrunner	Blue River Hybrids				102	1	102
SW 5113	S & W Seed Co.				97	1	97
SW 5213	S & W Seed Co.				115	1	115
SW5512 Y	S & W Seed Co.				109	1	109
SW 5909	S & W Seed Co.				94	1	94
VERNAL	Public	92	97	96	102	117	92
WL 365 HQ	W-L Research		94			1	94
Trial Mean		6.34	1.85	4.99	5.08	--	--
No. site years		4	1	3	1	--	--

Table 3:
Alfalfa Variety Trial
Ohio, Wooster, Sown 4-23-2013

Variety	28-May	26-Jun	31-Jul	8-Sep	Total 2016	2015	2014	2013	2013-16	% Stand
Released Cultivars:	----------Tons Dry Matter/Acre ----------									9/19/2016
4030	2.76	2.65	1.19	0.91	7.36	7.41	7.43	4.23	26.44	77
55H94	2.82	2.21	0.89	0.64	6.53	6.70	6.89	3.91	24.03	70
55V50	2.70	2.60	1.08	0.90	7.35	7.30	7.66	3.99	26.30	80
BlueJay	2.65	2.45	0.99	0.85	7.00	7.05	7.14	3.94	25.12	75
DBX 303 L	3.42	2.65	1.07	0.90	8.10	7.14	7.53	3.92	26.69	80
DBX 304 HY	2.56	2.62	1.15	0.98	7.37	7.26	7.31	4.26	26.20	78
DBX 305 LH	2.81	2.39	0.99	0.83	7.04	6.64	7.05	4.03	24.75	72
DG 4210	2.55	2.69	1.19	0.90	7.32	6.99	7.05	4.07	25.42	78
FSG 403 LR	2.67	2.83	1.18	1.00	7.70	7.30	7.46	4.10	26.56	73
FSG 424	2.51	2.77	1.18	0.94	7.23	6.97	6.94	3.69	24.83	78
FSG 524	2.27	2.53	1.03	0.95	6.78	6.77	6.99	3.81	24.35	83
L 455 HD	2.40	2.56	1.16	0.85	6.96	6.85	6.88	3.99	24.68	76
Persist III	2.93	2.62	1.07	0.95	7.55	7.06	7.78	4.46	26.85	80
Prolific II	2.77	2.74	1.11	0.90	7.57	7.40	7.40	4.49	26.86	70
Vernal	2.70	2.13	0.97	0.82	6.70	6.22	6.47	4.00	23.39	68
Mean	2.68	2.55	1.09	0.89	7.21	6.98	7.15	4.05	25.38	75
LSD 0.05	0.23	0.28	0.08	0.10	0.41	0.28	0.35	0.30	0.83	4.95
Prob > F	<.0001	<.001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	< .0001
CV %	6.1	7.6	5.1	7.7	4.0	2.8	3.5	5.1	2.7	4.6
MCV	8.6	10.8	7.2	10.9	5.7	4.0	4.9	7.3	3.3	6.6
LSR	19.9	39.6	25.7	27.1	26.1	23.4	27.0	37.0	23.9	32.8

* Variety tested using experimental seed that may not give performance identical to that of commercially available seed.
Data subjected to Nearest Neighbor AOV, adjusted means reported.

Establishment:	Seeded with a Hege 3-point hitch drill with presswheels at 16 lb/a.
Plot size:	4' x 20', 15' alleys and borders, RCBD with four reps.
Soil type / analysis:	Riddles silt loam, pH = 6.9, P =68 lb/a, K = 234 lb/a, CEC = 9.5 (10/14).
2016 Fertility:	Applied 807 lb/a 0-26-26 after first harvest.
2016 Pest control:	Insecticide was applied 9-June, 14-July and 23-August for potato leafhopper control.

Table 4:
Alfalfa Variety Trial
Ohio, South Charleston, Sown 5-20-14

					Total			
Variety	24-May	24-Jun	27-Jul	7-Sep	2016	2015	2014	2014-16
Released Cultivars:	---------- Tons Dry Matter/Acre ----------							
55Q27	2.24	1.75	1.47	1.28	6.74	7.08	1.47	15.30
55VR06	2.05	1.82	1.48	1.45	6.79	7.12	1.57	15.49
Caliber	2.23	1.55	1.41	1.28	6.47	6.88	1.28	14.59
Contender	2.13	1.60	1.51	1.27	6.52	6.83	1.48	14.87
Enduro Elite	2.10	1.40	1.42	1.25	6.19	6.77	1.38	14.32
Fierce	2.22	1.58	1.37	1.21	6.38	6.92	1.26	14.57
FSG 403 LR	2.31	1.77	1.50	1.35	6.94	7.06	1.63	15.60
FSG 424	2.13	1.80	1.58	1.23	6.74	6.72	1.37	14.81
FSG 524	2.12	1.89	1.48	1.18	6.67	6.67	1.39	14.79
L-455 HD	2.12	1.71	1.49	1.12	6.42	6.80	1.49	14.70
Mariner IV	2.52	1.93	1.54	1.42	7.42	7.22	1.68	16.30
Persist III	2.39	1.97	1.32	1.22	6.90	6.82	1.55	15.29
Vernal	2.14	1.61	1.38	1.22	6.35	6.46	1.48	14.31
Mean	2.21	1.69	1.46	1.27	6.63	6.86	1.48	14.97
LSD 0.05	0.31	0.31	0.21	0.15	0.72	0.56	0.24	1.20
Prob > F□	0.19 ns	<.01	0.61 ns	<.01	0.11 ns	0.27 ns	0.03	0.06
CV %	9.81	12.86	10.10	8.49	7.58	5.66	11.37	5.61
MCV	14.0	18.4	14.4	12.1	10.8	8.1	16.2	8.0
LSR	64.8	53.9	82.1	46.7	57.9	73.0	58.0	60.3

* Variety tested using experimental seed that may not give performance identical to that of commercially available seed.

Note: Stands for all varieties are at 95%.

Data subjected to Nearest Neighbor AOV, adjusted means reported.
ns = no significant differences among varieties.

Establishment:	Seeded with a Hege 3-point hitch drill with presswheels at 16 lb/a.
Plot size:	4' x 20' , 15'alleys and borders, RCBD with four reps.
Soil type / analysis:	Crosby silt loam, pH=7.0, P=66 lbs/a, K= 256 lbs/a, CEC=11.7, O.M.=1.4, (11/15).
2016 Pest control:	Insecticide was applied on 3-May for weevil contriol, and 9-June, 1-July, 18-August for potato leafhopper control.
2016 Fertility:	300 lb/A of 0-0-60 and 150 lb of 11-52-0 was applied on 4/6/2016.

Table 5:
Alfalfa Variety Trial
Ohio, North Baltimore, Sown 8-27-15

Variety	1-Jun	1-Jul	2-Aug	9-Sep	Total 2016
Released Cultivars:		---------- Tons Dry Matter/Acre ----------			
55Q27	1.50	1.07	1.18	1.28	5.03
55VR06	1.68	1.23	1.16	1.15	5.22
BlueJay HR	1.56	1.07	1.02	1.17	4.81
Caliber	1.24	1.03	1.07	1.17	4.51
Contender	1.18	0.98	1.12	1.36	4.65
Fierce	1.51	0.98	1.10	1.19	4.78
FSG 426	1.58	1.15	1.25	1.36	5.34
Mallard 5	1.47	1.09	1.29	1.42	5.28
Persist lll	1.64	1.21	1.32	1.12	5.28
Pluss lll	1.52	1.20	1.10	1.23	5.06
Red Falcon	1.44	1.06	1.23	1.21	4.95
Roadrunner	1.63	1.08	1.10	1.35	5.16
SW 5113	1.66	1.16	1.12	1.01	4.95
SW 5213	1.76	1.26	1.42	1.42	5.86
SW 5512 Y	1.85	1.16	1.15	1.36	5.52
SW 5909	1.48	1.03	1.06	1.19	4.76
Vernal	1.70	1.01	1.02	1.43	5.17
Mean	1.55	1.10	1.16	1.26	5.08
LSD 0.05	0.41	0.20	0.19	0.38	0.79
Prob > F□	0.16 ns	0.16 ns	<.01	0.79 ns	0.15 ns
CV %	18.67	12.88	11.72	21.46	10.88
MCV	26.6	18.3	16.7	30.5	15.5
LSR	61.4	73.1	48.2	90.9	58.4

* Variety tested using experimental seed that may not give performance identical to that of commercially available seed.

Note: Stands for all varieties are at 95%.

Data subjected to Nearest Neighbor AOV, adjusted means reported.
ns = no significant differences among varieties.

** Trial was fall seeded after spring planting failed **

Establishment:	Seeded with a Hege 3-point hitch drill with presswheels at 16 lb/a.
Plot size:	4' x 20' , 15'alleys and borders, RCBD with four reps.
Soil type / analysis:	Holtville silt loam, pH=6.6, P=60 lbs/a, K=410 lbs/a, CEC=19.0, O.M.=2.3, (11/15).
2016 Pest control:	Insecticide was applied on 15-June, 15-July and 22-August for potato leafhopper control
2015 Fertility:	100 lb/A of 18-46-0 and 200 lb/A of 0-0-60 was applied on 10/21/15.
2016 Fertility:	145 lb/A of 11-52-0 was applied on 6/2/16.

Table 6:
Alfalfa Variety Trial
Ohio, Wooster, Sown 4-25-16

Variety	7-Jul	8-Aug	13-Sep	Total 2016
Released Cultivars:	---------- Tons Dry Matter/Acre ----------			
55Q27	0.53	0.52	0.87	1.91
55VR08	0.41	0.48	0.79	1.68
GA-497 HD	0.49	0.67	0.94	2.10
KF 406 A2	0.51	0.57	0.88	1.95
KF 425 HD	0.49	0.54	0.93	1.96
Lightning Bolt	0.41	0.53	0.88	1.82
Persist III	0.51	0.52	0.89	1.92
Pluss III	0.44	0.51	0.85	1.80
Rebound 6XT	0.47	0.52	0.87	1.85
Vernal	0.35	0.60	0.84	1.80
WL 365 HQ	0.34	0.54	0.85	1.73
Mean	0.45	0.54	0.86	1.85
LSD 0.05	0.10	0.08	0.07	0.17
Prob > F□	<.001	<.001	<.01	<.0001
CV %	16.14	10.54	5.58	6.36
MCV	22.9	15.0	7.9	9.0
LSR	54.5	42.3	44.9	39.5

* Variety tested using experimental seed that may not give performance identical to that of commercially available seed.

Note: Stands for all varieties are at 100 %.

Data subjected to Nearest Neighbor AOV, adjusted means reported.

Establishment:	Seeded with a Hege 3-point hitch drill with presswheels at 16 lb/a.
Plot size:	4' x 20', 15' alleys and borders, RCBD with four reps.
Soil type / analysis:	Riddles silt loam, pH = 66.8, P =46 lb/a, K = 181 lb/a, CEC = 8.0 (4/14).
2016 Fertility:	Applied 660 lb/a 0-18-46 after first harvest.
2016 Pest control:	Insecticide was applied 27-July and 30-August for potato leafhopper control.

Orchardgrass

The orchardgrass trial seeded at South Charleston had an average yield of 5.33 tons/acre. Orchardgrass varieties can have significant maturity differences.

Table 7:
Orchargrass Variety Trial
Ohio, South Charleston, Sown 5-20-14

						Total				Maturity
Variety	Marketers	18-May	20-Jun	19-Aug	27-Sep	2016	2015	2014	2014-16	5/18/2016
			---------- Tons Dry Matter/ Acre ----------							
Barlegro	Barenbrug USA	2.63	0.85	1.26	1.22	5.91	5.84	1.19	13.13	1.0
FSG 5060G*	Allied Seed	2.30	0.76	1.13	1.17	5.49	6.51	1.71	13.55	3.3
OG0604WH*	Allied Seed	2.32	0.73	1.04	1.14	5.25	6.42	1.73	13.17	2.7
Pennlate	Public	2.45	0.68	1.15	1.28	5.47	5.92	1.50	13.17	3.7
Potomac	Public	2.31	0.62	1.04	1.18	5.12	5.72	1.60	12.51	4.8
Profit	DLF International	2.54	0.82	1.00	1.12	5.46	6.40	1.55	13.30	2.8
SS-0708OGDT	Allied Seed	1.80	0.57	1.06	1.17	4.63	6.09	1.51	12.19	4.2
Mean		2.34	0.72	1.10	1.18	5.33	6.13	1.54	13.00	3.2
LSD 0.05		0.58	0.23	0.20	0.20	0.69	0.54	0.19	0.89	0.7
Prob > F		0.36 ns	0.18 ns	0.13 ns	0.66 ns	0.03	0.16 ns	<.001	0.05	<.0001
CV %		16.7	21.8	11.9	11.3	8.7	5.9	8.2	4.6	14.9

* Variety tested using experimental seed that may not give performance identical to that of commercially available seed.

Maturity: 1 =vegetative, 2 =early boot, 3 =initial emergence from boot, 4 =complete emergence, 5 = elongated peduncle, 6 = preanthesis, 7 = anthesis, 8 = post anthesis.

Data subjected to Nearest Neighbor AOV, adjusted means reported.

Establishment: Seeded with a Hege 3-point hitch drill with presswheels at 20 lb/a.
Plot size: 4' x 15' , 15'alleys and borders, RCBD with four reps.
Soil type / analysis: Kokomo silt loam, pH=6.8, P=126 lbs/a, K= 338 lbs/a, CEC=19.2, O.M.=3.4, (10/13).
2016 Fertility Applied 100 lb/a of 46-0-0 on 23-March, 23-May, 21-June, 22-August.

Tall Fescue

The tall fescue trial established at South Charleston in 2014 had an average yield of 5.56 tons/acre. Low rainfall from May and June reduced yields in the second cutting. New varieties that are endophyte-free or that contain a non-toxic endophyte have potential to provide improved animal performance compared with the old endophyte-infected varieties, especially during the summer grazing season, and to provide forage for beef cattle and sheep during autumn and early winter.

In this trial we included KY 31 as a check variety, both endophyte-free (KY 31-) and endophyte-infected (KY 31+).

Table 8:
Tall Fescue Variety Trial
Ohio, South Charleston, Sown 5-20-14

						Total				Maturity
Variety	Marketer	18-May	20-Jun	19-Aug	27-Sep	2016	2015	2014	2014-16	5/18/2016
		---------- Tons Dry Matter/ Acre ----------								
Barelite	Barenbrug USA	2.05	0.71	1.06	1.46	5.30	7.43	1.48	8.91	2.3
Brava	Allied Seed	2.14	0.88	1.55	1.56	6.05	7.80	2.10	9.91	4.0
Brutus	Saddle Butte Ag	2.07	0.65	1.16	1.31	5.24	7.97	1.63	9.60	3.0
KY 31 -	Public	1.95	0.71	1.25	1.55	5.46	7.98	1.86	9.85	3.5
KY 31+	Public	2.31	0.87	1.24	1.41	5.91	7.84	1.61	9.45	3.5
FSG 0402TF*	Allied Seed	2.19	0.77	1.30	1.33	5.62	7.59	1.94	9.53	3.8
TF 0705SL*	Allied Seed	1.97	0.75	1.48	1.28	5.36	7.55	2.21	9.76	3.3
Mean		2.10	0.76	1.29	1.42	5.56	7.74	1.83	9.57	3.3
LSD 0.05		0.29	0.24	0.26	0.24	0.69	0.77	0.48	0.94	0.7
Prob > F		0.16 ns	0.42 ns	0.01	0.11 ns	0.12 ns	0.65 ns	0.03	0.38 ns	<.001
CV %		9.2	21.6	13.7	11.6	8.3	6.7	17.7	6.6	14.4

* Variety tested using experimental seed that may not give performance identical to that of commercially available seed.

Maturity: 1 =vegetative, 2 =early boot, 3 =initial emergence from boot, 4 =complete emergence, 5 = elongated peduncle, 6 = preanthesis, 7 = anthesis, 8 = post anthesis.

Data subjected to Nearest Neighbor AOV, adjusted means reported.

Establishment: Seeded with a Hege 3-point hitch drill with presswheels at 20 lb/a.
Plot size: 4' x 15' , 15'alleys and borders, RCBD with four reps.
Soil type / analysis: Kokomo silt loam, pH=6.8, P=126 lbs/a, K= 338 lbs/a, CEC=19.2, O.M.=3.4, (10/13).
2016 Fertility Applied 100 lb/a of 46-0-0 on 23-March, 23-May, 21-June, 22-August.

Annual Ryegrass

An annual ryegrass trial was planted in September 2015. Winter injury ratings were low except for one variety. Forage yields in 2015-16 were near the long-term average at this location. Annual ryegrass is a cool-season annual bunchgrass that is highly palatable and digestible. It has high seedling vigor.

Table 9:
Annual Ryegrass Variety Trial
Ohio, South Charleston, Sown 9-4-15

Variety	Marketer	20-Nov-15	27-Apr	24-May	20-Jun	Total 2015-16	Winter Injury*
		---------- Tons Dry Matter/Acre ----------					3/14/2016
B-15.2471*	Lewis Seed	0.12	2.31	1.62	1.06	5.11	1
B-15.2472*	Lewis Seed	0.07	2.50	1.62	0.95	5.13	1
FIPE	Univ.of Florida	0.08	2.22	1.76	1.39	5.45	1
Fiser	Univ.of Florida	0.45	0.24	0.77	0.52	1.97	4
Fria	Allied Seed	0.19	2.24	1.71	1.28	5.42	1
Frosty	Central Farm & Garden	0.14	2.17	1.55	1.08	4.94	1
KoSpeed	Smith Seed	0.14	2.25	1.72	1.02	5.12	1
KoWinearly	Smith Seed	0.01	2.29	1.71	1.41	5.42	1
Meroa	Smith Seed	0.09	2.18	2.25	1.54	6.07	1
Nu Spirit	Oregon Seed	0.07	2.29	1.68	1.38	5.42	1
Passerel Pluss	Pennnington Seed	0.26	2.16	1.69	1.20	5.31	1
PPG-TAR113	Smith Seed	0.00	0.46	2.40	0.93	3.79	1
PS 12	Pennnington Seed	0.33	1.75	1.46	0.99	4.53	1
PS 15	Pennnington Seed	0.23	2.19	1.77	1.52	5.71	1
Winterhawk	Oregon Seeds	0.06	2.38	1.82	1.44	5.69	1
Mean		0.15	1.98	1.70	1.18	5.01	1
LSD 0.05		0.09	0.27	0.18	0.24	0.43	0.21
Prob > F		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
CV %		40.1	9.5	7.3	14.3	6.0	12.1

* Experimental varieties that may be named at a later date

***Winter Injury** -- 1 = no injury to 5= severe injury (dead)

Note: Maturity on April 27, 2016 were vegetative for all varieties.
Maturity on May 24, 16 were complete emergence from boot for all varieties.
Maturity on June 20, 16 were anthesis for all varieties.

Soil type / analysis: Crosby silt loam, pH= 6.1, P=240 lbs/a, K=410 lbs/a, CEC=17.7, O.M.=2.2,(10/15).
2016 Fertilization: Applied 50 lb/a of 46-0-0 on 9-October, 100 lb/a of 46-0-0 on 23-March and 80 lb/a of 46-0-0 on 29-April and 25-May.

ADDRESS OF MARKETERS

Allied Seed
1108 Hilldale Drive
Macon, MO 63552
www.alliedseed.com

Barenbrug USA
P.O. Box 239
Tangent, OR
www.barusa.com

Beck's Hybrids
6767 East 276th St.
Atlanta, IN 46031
www.beckshybrids.com

Blue River Hybrids
27087 Tiber Rd.
Kelly, IA 50134
www.blueriverorgseed.com

Byron Seeds
775 N. 350 E.
Rockville, IN 47872
www.byronseeds.com

Central Farm & Garden
380 N. Smyser Rd.
Wooster, Ohio 44691
www.centralfarm.com

Croplan Genetics
See Local Retailer
www.croplangenetics.com

Crop Protection Services
See Local Retailer
www.cpsagu.com

DLF International Seeds
175 W. H Street
Halsey, OR 97348
www.dlfis.com

Doeblers PA Hybrids
202 Tiadaghton Ave.
Jersey Shore, PA 17740
www.doeblers.com

Farm Science Genetics
9311 Highway 45
Nampa, ID83686
www.farmsciencegenetics.com

Legacy Seeds, Inc.
290 Depot St
Scandinavia, WI 54977
www.Legacyseeds.com

Lewis Seeds
P.O. Box 100
Shedd, OR 97377
www.lewisseed.com

Oregon Seed Inc.
33080 Red Bridge Rd.
Albany, OR 97322
www.oregroseeds.com

Pennington Seed
P.O. Box 290
Madison, GA 30650
www.penningtonusa.com

Pioneer Hi-Bred Int'l
See Local Retailer
www.pioneer.com

Preferred Seed Company
575 Kennedy Rd.
Buffalo, NY 14227
www.preferredseed.com

Saddle Butte Ag., Inc.
P.O. Box 50
Shedd,OR 97377
www.saddlebutte.com

Smith Seed Service
P.O. Box 288
Halsey, OR 97348
www.smithseed.com

S & W Seed Company
7108 N. Fresno St.
Fresno, CA 93720
www.swseedco.com

The Cisco Companies
602 N. Shortridge Rd.
Indianapollis, IN 46219
www.ciscoseeds.com

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COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

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