



Northern NY Agricultural Development Program 2013 Project Report

Tall Fescue Variety Assessment in Northern New York

Project Leader(s):

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Background:

Most cropland in northern NY is better suited to perennial grass production than to legumes or row crop production. Previous grass studies at Canton, Chazy and Willsboro have indicated that tall fescue is very persistent in northern NY and will yield as much or more than other cool-season grass species.

There continue to be many new tall fescue varieties, most endophyte-free, although a number of the new varieties also have a “Novel endophyte” version. These varieties have an endophytic fungus in the fescue, but it gives the plant added vigor without the toxic side effects of typical endophyte-infected fescue. The Novel or “Friendly endophyte” varieties are being promoted in the Northeast, it is not clear that they are worth the extra seed cost in our region.

Tall fescue often ranks highest for yield among cool-season grass species in New York State. The top tall fescue varieties yielded 16.5 tons silage equivalent/acre in past northern NY trials, with a 3 ton range among entries in a trial. Although tall fescue appears to be less persistent than other grasses in the upper Midwest, it has survived northern New York winters over the past decade and does not appear to have any persistence problems in NYS.

Several feeding trials conducted at the Cornell Animal Science Farm in Harford, NY have demonstrated that tall fescue silage can produce as much milk per cow as alfalfa silage when rations are balanced. Tall fescue is typically lower in crude protein than other grasses, except for timothy, but is similar in fiber concentration and quality.

Methods:

Forty varieties of tall fescue suitable for northern NY were planted at Chazy in the spring of 2011. This is the most comprehensive tall fescue variety trial in the country. Six of the

varieties contained the Novel endophyte (BarOptima PLUS E34, Duramax Armor, Jesup Max Q, Martin 2 647, Seine Happe, and Tower 647), 5 of these also had the same variety in the non-endophyte version. Almost all variety trials typically are on an entry fee basis, resulting in a very small subset of the total varieties, often mostly experiment germplasm entries. Our objectives are to compare these new fescue varieties for both yield and quality. The trial was fertilized with recommended N, P and K fertilizer in the spring of 2013.

Varieties were harvested three times during 2013: May 31, July 12, and Sept. 25. This is an intensive 3-cut system, with the first and second cuts taken at approximately 50-55% NDF, with a 3rd cut in the fall suitable for dry cow forage. Samples were analyzed for forage quality constituents, comparing varietal changes over maturation. All three harvests were analyzed for quality in 2013, so that seasonal yield x quality calculations could be made. For the second year in a row, excess spring rainfall resulted in partial flooding of the trial, particular in the first field replicate.

Results:

Yield

For all data Tables, varieties within one LSD unit of the top and the bottom ranking are shaded. Yields for 2013 were relatively low, spring growth appeared to be set back possibly due to light winter injury. The variety ‘Stockman’ was highest yielding and ‘Advance’ lowest yielding in both years.

Yields were evaluated averaged over 2012 and 2013 seasons (Table 2). Since yields were very low in field replicate one in both years due to flooding, it was not included in this 2-year yield summary. Yield distribution for 3-cuts at Chazy was 38, 28, and 34%. Yield distribution was more normal in 2013, compared to 2012 when almost 50% of the annual yield was in the fall cut, due to unusual spring weather.

There were 5 pairs of Novel endophyte-infected vs. normal varieties. For the two years of this trial, Novel endophyte types averaged 3.48 tons/a, while normal types averaged 3.57 tons/a. This is consistent with our previous tall fescue variety trial results in NYS. While Novel endophyte tall fescue varieties are essential where biotic or abiotic stresses are high (such as the mid-South USA), we have neither the very high summer temperatures nor any significant insect pressure. There is no advantage for us in purchasing the relatively high-priced Novel endophyte varieties in NYS.

Forage Quality

Crude protein varied from 16 to 21% at Cut 1 (Table 3) and NDF varied from 50 to 60% (Table 4). Crude protein was quite low in the 2nd cut, it is expected to be very low for a fall cut. Fall-cut grass is typically suitable for dry cows or heifers, but not for lactating cows. Rankings for NDFD (Table 5), RFQ (Table 6), Milk/ton (Table 7), and Forage Value (FORVAL, Table 8) were relatively similar, indicating that all these quality indices may serve the same purpose. FORVAL is a program developed by Dr. Gary Fick at Cornell, which uses current prices of protein (Soybean meal), energy (corn grain), and hay to generate a dollar value for the protein and energy in the forage. With the current

high price of protein supplement, the estimated value of a 1 % unit increase in CP was many times more valuable than a 1 % unit increase in fiber digestibility (NDFD). Given that animal feeding trials have concluded that a 1% unit increase in NDFD will increase milk/cow/day by over 1 pound in high producing cows, it is clear that NDFD is severely undervalued in the available indexes.

Forage Value per acre

The most commonly used indicator of forage yield x quality is Milk/acre from the Milk2006 spreadsheet program. This program is greatly influenced by forage yield, approximately 80-90% of the total forage value per acre can be attributed to differences in yield. Forage quality has little influence on rankings, unless there are huge differences in quality among entries (e.g. brown-midrib types). Other methods of generating yield x quality values also were calculated, such as multiplying RFQ times yield, and multiplying FORVAL times yield, to generate relative forage values per acre. RFQ-yield and FORVAL-yield are more influenced by forage quality than is Milk/acre.

A new index was created in an effort to further increase the influence of forage quality, NDFD in particular, on total forage value. First an average or base value per ton of forage was selected. Then FORVAL was used to generate a correction value for each 1% unit change in CP from the trial mean. A 1% unit change in NDFD was made equal in value to a 1% unit change in CP. All entries were then adjusted in base value, based on their deviation from the trial mean in CP and NDFD, and a grass value/acre was calculated. The resulting Grass value calculation (GRASVAL/acre) has approximately 50% of its total value based on changes in yield and 50% based on changes in forage quality.

Each of the four yield x quality indices give slightly different rankings (Tables 9 & 10). In particular, a comparison of Milk/acre (heavy emphasis on yield) with GRASVAL/acre (equal emphasis on yield and quality), shows that some entries shift up or down up to 10 places in the ranking between these two indices. For example, *Courtenay* is ranked #9 under Milk/acre and #1 under GRASVAL/acre. *Courtenay* ranked #20 in total yield for 2013. Overall, however, the relatively modest differences in quality among varieties when averaged over 3 harvests result in relatively similar rankings among the indices.

Conclusions/Outcomes/Impacts:

- Spring heading date of a variety had very little effect on total seasonal yield (2012).
- There was no relationship between total seasonal yield and spring adjusted NDFD (2012).
- Both NDF and NDFD in tall fescue spring growth are controlled as much by plant age (day of year) as they are by morphological maturity (2012).
- The strong negative relationship between NDF at heading and NDFD at heading implies that there have not been significant advances in breeding for higher NDFD in tall fescue (2012).
- The relatively narrow range in adjusted NDFD (adjusted to the trial average NDF) also suggests that there have not been significant advances in breeding for NDFD (2012).

- It is probably advantageous to select a later maturing grass variety as a companion with alfalfa.
- If choosing a fescue variety for a pure stand, the highest GRASVAL/acre should be the best combination of yield and quality for a variety.
- In a mixed stand, most producers are looking for a high proportion of alfalfa, with the highest possible NDFD for the grass at harvest. High grass yield potential may not be desirable, as this likely indicates a more competitive grass. Harvest date is usually based on alfalfa maturity, not on the grass. Therefore, if choosing a fescue variety to seed with alfalfa, simply select the variety in a trial with the highest NDFD at spring harvest, no adjustments necessary.
- It is likely that these conclusions may apply to the other cool-season grass species.

Outreach:

A Research Update factsheet is being prepared describing the results of this trial.

Next Steps:

This work has indicated that timely harvest of grass, particularly in the spring, will have a large impact on fiber digestibility. Additional research on spring harvest timing, especially with alfalfa-grass mixtures is indicated.

Acknowledgments:

We gratefully acknowledge the Cornell Agricultural Experiment Station for providing the farm crew for plot maintenance and assistance with harvesting.

Reports and/or articles in which results of this project have been published:

Cherney, J.H., M. Davis, and K. Paddock. 2014. Tall Fescue Variety Trial, Chazy, NY 2012-13. Information Sheet #1, Forage Research Update Series, www.forages.org.

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Table 1. Dry matter yield for tall fescue variety trial, 2013, Chazy, NY.

	Cut 1	Cut 2	Cut 3	Total	Total
Variety	Tons DM/a	Tons DM/a	Tons DM/a	Tons DM/a	Rank
Stockman	1.47	1.05	1.35	3.89	1
Rustler	1.35	1.05	1.27	3.86	2
Kora	1.32	1.01	1.42	3.81	3
KY-31	1.29	1.07	1.18	3.74	4
Duramax Armor	1.54	1.03	1.27	3.70	5
Barcel	1.49	0.90	1.21	3.69	6
Montebello	1.38	1.23	1.23	3.69	7
Kentucky 32	1.40	0.98	1.32	3.69	8
Barduram	1.36	1.07	1.08	3.65	9
Orygun	1.42	0.90	1.16	3.62	10
Teton	1.31	1.04	1.29	3.62	11
Cajun II	1.45	1.01	1.11	3.61	12
Festival	1.29	1.03	1.23	3.57	13
Duramax	1.42	1.07	1.15	3.57	14
Bronson	1.53	0.87	0.95	3.55	15
BarOptima PLUS E34	1.15	1.01	1.21	3.50	16
Martin 2	1.36	1.05	1.15	3.48	17
Atlas	1.13	0.95	1.13	3.47	18
Enforcer	1.15	1.01	1.21	3.47	19
Courtenay	1.48	1.12	1.17	3.46	20
Enhance	1.41	1.01	1.20	3.45	21
Siberia	1.42	0.96	1.20	3.45	22
Au Triumph	1.31	0.92	1.05	3.42	23
Seine	1.21	0.96	1.29	3.40	24
Fuego	1.46	0.97	1.27	3.40	25
Jesup Max Q	1.28	0.78	1.22	3.38	26
Tuscany II	1.38	1.06	1.13	3.38	27
Martin 2 647	1.17	0.99	1.19	3.37	28
Goliath	1.39	0.96	1.21	3.37	29
Savory	0.97	1.27	1.08	3.33	30
Jesup L	1.44	0.86	1.06	3.32	31
Hymark	1.18	0.89	1.08	3.30	32
Bull	1.39	0.78	1.12	3.29	33
Fawn	1.19	1.29	1.09	3.25	34
Ranger	1.21	0.91	1.10	3.20	35
Tower	1.29	0.82	1.15	3.17	36
Bariane	0.93	0.91	1.19	3.12	37
Seine Happe	1.28	0.84	1.22	3.11	38
Tower 647	1.19	0.81	1.19	2.92	39
Advance	0.78	0.91	1.06	2.81	40
Mean	1.30	0.98	1.18	3.45	
LSD 0.10	0.16	0.18	0.18	0.32	

Table 2. Dry matter yield for tall fescue variety trial, average of 2012 and 2013, Chazy NY. (Field replicate #1 was deleted from this summary. Novel endophyte varieties bolded).

	2-year Average	
Rank	Cultivar	Tons DM/a
1	Stockman	4.11
2	Duramax Armor	3.99
3	Barduram	3.89
4	Festival	3.88
5	Rustler	3.86
6	Cajun II	3.82
7	Kora	3.80
8	Montebello	3.77
9	Bronson	3.73
10	Teton	3.69
11	Duramax	3.69
12	Barcel	3.68
13	BarOptima PLUS E34	3.67
14	Atlas	3.65
15	Tuscany II	3.65
16	Fuego	3.64
17	Enforcer	3.62
18	Tower	3.61
19	Jesup Max Q	3.59
20	KY-31	3.58
21	Orygun	3.57
22	Enhance	3.55
23	Martin 2	3.55
24	Seine	3.54
25	Goliath	3.50
26	Savory	3.49
27	Kentucky 32	3.47
28	Jesup L	3.46
29	Au Triumph	3.45
30	Siberia	3.38
31	Bull	3.38
32	Seine Happe	3.36
33	Hymark	3.35
34	Courtenay	3.33
35	Bariane	3.33
36	Martin 2 647	3.26
37	Fawn	3.24
38	Tower 647	3.19
39	Ranger	3.15
40	Advance	2.98
	Mean	3.56
	LSD 0.10	0.31

Table 3. Crude protein for tall fescue variety trial, 2013, Chazy, NY. (Cut 1 varieties are ranked in order from highest to lowest CP).

Cut 1		CP, Cut 1	CP, Cut 2	CP, Cut 3
Rank	Variety	% DM	% DM	% DM
1	Courtenay	21.5	13.2	8.7
2	Siberia	20.1	11.7	8.8
3	Advance	19.9	14.1	9.4
4	BarOptima PLUS E34	19.3	14.7	10.2
5	Seine Happe	19.1	13.9	8.3
6	Bariane	18.9	14.8	10.7
7	Barduram	18.7	13.8	8.6
8	Seine	18.7	13.2	7.9
9	Tower 647	18.7	13.4	9.1
10	Barcel	18.7	14.2	10.1
11	Enforcer	18.5	12.9	9.9
12	Bronson	18.4	13.5	9.9
13	Tower	18.4	13.1	8.8
14	Jesup L	18.4	12.3	9.1
15	Savory	18.4	14.1	9.8
16	Ranger	18.3	12.7	9.8
17	Jesup Max Q	18.3	12.3	8.9
18	Montebello	18.1	13.2	8.6
19	Fuego	18.1	13.0	8.3
20	Kora	18.0	12.8	9.0
21	Kentucky 32	17.9	12.1	8.6
22	Hymark	17.9	14.2	9.7
23	Stockman	17.8	13.1	8.5
24	Festival	17.7	12.4	8.4
25	Orygun	17.6	12.3	9.6
26	Rustler	17.6	12.4	9.1
27	Martin 2 647	17.5	12.1	9.4
28	KY-31	17.5	12.4	9.6
29	Martin 2	17.3	11.8	9.2
30	Duramax Armor	17.3	12.2	8.9
31	Duramax	17.2	12.4	9.4
32	Teton	17.2	12.5	8.8
33	Atlas	17.2	13.3	9.4
34	Cajun II	17.1	12.3	9.3
35	Enhance	17.1	13.6	9.8
36	Fawn	16.9	13.2	10.8
37	Goliath	16.9	13.4	9.0
38	Tuscany II	16.8	12.1	9.3
39	Bull	16.7	14.0	9.8
40	Au Triumph	16.6	13.5	9.7
	Mean	18.1	13.1	9.3
	LSD 0.10	1.17	1.17	0.62

Table 4. NDF for tall fescue variety trial, 2013, Chazy, NY. (Cut 1 varieties are ranked in order from lowest to highest NDF).

Cut 1		NDF, Cut 1	NDF, Cut 2	NDF, Cut 3
Rank	Variety	% DM	% DM	% DM
1	Siberia	50.1	53.4	58.6
2	Advance	51.0	54.7	60.5
3	Courtenay	52.0	55.7	58.9
4	Bariane	53.1	53.2	59.2
5	Barduram	53.4	56.5	58.4
6	Stockman	53.4	54.2	58.7
7	Tower 647	53.7	53.2	60.0
8	Barcel	53.7	53.3	59.0
9	Seine Happe	54.4	56.9	62.0
10	Fuego	54.6	53.3	58.2
11	BarOptima PLUS E34	54.9	54.7	58.7
12	Festival	54.9	54.6	59.0
13	Montebello	55.0	55.1	58.3
14	Tower	55.2	54.1	60.1
15	Savory	55.4	55.2	61.9
16	Kora	55.5	55.7	62.2
17	Rustler	55.6	53.6	59.2
18	KY-31	55.8	55.7	61.3
19	Fawn	55.9	56.2	62.9
20	Enforcer	56.0	53.4	59.9
21	Jesup Max Q	56.0	54.4	60.1
22	Duramax Armor	56.2	54.3	60.2
23	Seine	56.3	56.1	61.0
24	Goliath	56.3	54.1	60.9
25	Ranger	56.5	52.8	59.7
26	Kentucky 32	56.7	52.6	59.7
27	Enhance	56.8	55.1	60.8
28	Tuscany II	56.9	54.0	58.5
29	Martin 2	56.9	52.8	60.3
30	Jesup L	57.0	53.6	59.7
31	Au Triumph	57.2	58.4	64.1
32	Cajun II	57.3	54.5	61.1
33	Bronson	57.3	55.8	61.4
34	Atlas	57.9	57.6	62.4
35	Martin 2 647	57.9	52.9	59.2
36	Hymark	58.0	55.3	60.3
37	Orygun	58.6	56.3	63.9
38	Teton	58.8	55.0	61.6
39	Duramax	58.9	56.0	61.9
40	Bull	59.6	58.1	62.9
	Mean	55.8	54.8	60.4
	LSD 0.10	1.79	1.65	1.19

Table 5. NDFD for tall fescue variety trial, 2013, Chazy, NY. (Cut 1 varieties are ranked in order from highest to lowest NDFD).

Cut 1		NDFD, Cut 1	NDFD, Cut 2	NDFD, Cut 3
Rank	Variety	%	%	%
1	Siberia	78.7	60.5	57.4
2	Courtenay	77.9	60.6	56.1
3	Advance	76.0	63.1	57.0
4	Barcel	73.6	64.1	58.0
5	BarOptima PLUS E34	73.4	61.2	58.5
6	Bariane	73.2	62.3	55.5
7	Kora	73.0	62.4	55.3
8	Fuego	73.0	64.3	59.8
9	Savory	72.8	61.3	56.7
10	Barduram	72.3	57.5	58.0
11	Ranger	71.3	62.3	58.3
12	Stockman	71.2	60.1	59.0
13	Montebello	71.1	60.3	58.2
14	Jesup L	70.8	62.0	56.4
15	Tower 647	70.7	60.6	57.3
16	Seine Happe	70.5	57.5	56.1
17	Enhance	70.5	61.2	57.1
18	Bronson	70.5	61.0	57.3
19	Goliath	70.3	62.1	55.3
20	Tower	70.2	59.8	56.9
21	Festival	70.1	59.5	58.2
22	Tuscany II	70.1	61.6	61.4
23	Rustler	70.0	59.6	58.3
24	Jesup Max Q	70.0	61.0	55.9
25	Seine	69.8	56.8	56.6
26	KY-31	69.6	57.6	55.2
27	Kentucky 32	69.6	61.6	58.5
28	Hymark	69.5	60.8	58.5
29	Enforcer	69.3	61.0	55.1
30	Duramax Armor	69.1	62.2	57.8
31	Atlas	68.3	59.0	54.6
32	Martin 2	67.6	62.1	55.2
33	Cajun II	67.6	59.7	53.9
34	Fawn	67.3	59.0	51.2
35	Martin 2 647	67.3	60.0	57.1
36	Au Triumph	67.3	58.6	51.5
37	Teton	67.1	59.0	54.0
38	Bull	66.9	57.2	52.4
39	Duramax	66.8	60.1	54.4
40	Orygun	66.2	58.0	50.7
	Mean	70.5	60.5	56.4
	LSD 0.10	1.99	3.29	2.21

Table 6. Relative Forage Quality for tall fescue variety trial, 2013, Chazy, NY. (Cut 1 varieties are ranked in order from highest to lowest RFQ).

Cut 1		RFQ, Cut 1	RFQ, Cut 2	RFQ, Cut 3
Rank	Variety			
1	Siberia	200	139	119
2	Courtenay	192	133	115
3	Advance	190	142	115
4	Barcel	175	149	120
5	Bariane	175	144	113
6	Barduram	172	123	122
7	BarOptima PLUS E34	170	137	121
8	Fuego	170	149	128
9	Stockman	168	136	124
10	Kora	168	138	106
11	Savory	167	136	110
12	Tower 647	166	140	116
13	Montebello	164	134	122
14	Seine Happe	164	122	110
15	Festival	161	133	121
16	Tower	161	136	115
17	Ranger	160	146	119
18	Rustler	159	137	120
19	Goliath	158	141	110
20	Jesup Max Q	158	138	112
21	KY-31	158	126	107
22	Jesup L	157	143	114
23	Enhance	157	136	114
24	Seine	156	122	113
25	Enforcer	156	141	111
26	Tuscany II	156	141	130
27	Bronson	155	134	113
28	Duramax Armor	155	141	116
29	Kentucky 32	155	145	119
30	Hymark	151	135	118
31	Fawn	151	128	94
32	Martin 2	149	145	110
33	Atlas	148	124	104
34	Cajun II	148	134	105
35	Au Triumph	147	121	93
36	Martin 2 647	145	140	117
37	Teton	143	131	104
38	Duramax	141	131	105
39	Orygun	141	125	92
40	Bull	140	118	98
	Mean	160	135	113
	LSD 0.10	9.4	11.5	7.3

Table 7. Milk/ton for tall fescue variety trial, 2013, Chazy, NY. (Cut 1 varieties are ranked in order from highest to lowest Milk/ton).

Cut 1		Milk/t, Cut 1	Milk/t, Cut 2	Milk/t, Cut 3
Rank	Variety	lbs	lbs	lbs
1	Siberia	3511	3010	2826
2	Courtenay	3436	2931	2775
3	Advance	3433	3016	2805
4	Bariane	3319	3042	2758
5	Barcel	3305	3084	2844
6	Barduram	3287	2827	2893
7	Fuego	3269	3094	2984
8	Stockman	3269	2967	2913
9	BarOptima PLUS E34	3264	2971	2847
10	Tower 647	3246	3014	2801
11	Kora	3241	2970	2656
12	Savory	3239	2960	2727
13	Seine Happe	3219	2811	2771
14	Montebello	3215	2939	2867
15	Festival	3198	2946	2874
16	Tower	3189	2967	2822
17	Ranger	3174	3069	2816
18	Rustler	3174	2985	2808
19	KY-31	3163	2864	2683
20	Goliath	3161	3017	2741
21	Jesup Max Q	3159	2985	2756
22	Enhance	3151	2962	2793
23	Jesup L	3144	3036	2796
24	Seine	3143	2826	2800
25	Enforcer	3143	3021	2738
26	Tuscany II	3140	3012	2955
27	Duramax Armor	3138	3019	2788
28	Kentucky 32	3132	3064	2822
29	Bronson	3127	2932	2758
30	Fawn	3109	2873	2525
31	Hymark	3084	2941	2830
32	Martin 2	3082	3065	2742
33	Cajun II	3071	2956	2685
34	Au Triumph	3068	2785	2490
35	Atlas	3067	2824	2666
36	Martin 2 647	3040	3016	2816
37	Teton	3009	2921	2660
38	Duramax	2995	2911	2679
39	Orygun	2994	2850	2520
40	Bull	2978	2761	2589
	Mean	3177	2956	2765
	LSD 0.10	90	115	89

Table 8. Forage Value (FORVAL) for tall fescue variety trial, 2013, Chazy, NY. (Cut 1 varieties are ranked in order from highest to lowest value).

Cut 1		FORVAL, Cut 1	FORVAL, Cut 2	FORVAL, Cut 3
Rank	Variety	\$/dry ton	\$/dry ton	\$/dry ton
1	Courtenay	273	181	134
2	Siberia	269	175	136
3	Advance	262	193	137
4	Bariane	244	203	149
5	Barduram	241	183	137
6	BarOptima PLUS E34	240	197	147
7	Barcel	239	198	147
8	Seine Happe	239	181	124
9	Tower 647	238	191	135
10	Stockman	232	184	135
11	Fuego	231	189	136
12	Tower	230	185	134
13	Savory	230	190	136
14	Montebello	229	183	136
15	Seine	228	179	124
16	Enforcer	227	186	141
17	Kora	226	178	128
18	Festival	226	178	134
19	Jesup Max Q	225	178	133
20	Ranger	224	187	142
21	Jesup L	223	182	136
22	Bronson	222	183	138
23	Rustler	221	180	138
24	Kentucky 32	220	182	133
25	KY-31	220	174	135
26	Duramax Armor	217	178	133
27	Fawn	214	179	138
28	Hymark	214	191	140
29	Martin 2	214	179	135
30	Enhance	213	187	139
31	Goliath	213	188	132
32	Au Triumph	212	173	126
33	Martin 2 647	212	181	140
34	Cajun II	211	177	133
35	Tuscany II	210	177	143
36	Atlas	209	175	131
37	Orygun	209	170	126
38	Teton	205	176	127
39	Duramax	205	173	132
40	Bull	198	178	131
	Mean	225	182	135
	LSD 0.10	12.7	10.1	6.18

Table 9. Milk per acre and Relative Forage Quality per acre for tall fescue variety trial, 2013, Chazy NY. Values are a sum of all three cuts.

	Milk/acre			RFQ/acre
Variety	Lbs/acre	Rank	Cultivar	Relative value
Stockman	11854	1	Stockman	743
Rustler	11463	2	Barcel	716
Kora	11412	3	Kora	715
Barduram	11269	4	Rustler	711
Montebello	11158	5	Courtenay	702
Barcel	11028	6	Montebello	694
KY-31	11021	7	Barduram	692
Goliath	10977	8	BarOptima PLUS E34	679
Duramax Armor	10957	9	Duramax Armor	674
Courtenay	10868	10	Goliath	674
BarOptima PLUS E34	10749	11	Siberia	669
Kentucky 32	10698	12	KY-31	668
Enhance	10685	13	Kentucky 32	666
Festival	10662	14	Fuego	665
Enforcer	10637	15	Festival	657
Cajun II	10482	16	Enhance	657
Fuego	10479	17	Enforcer	655
Duramax	10422	18	Tuscany II	643
Atlas	10413	19	Bronson	634
Bronson	10330	20	Cajun II	628
Siberia	10272	21	Bariane	627
Tuscany II	10182	22	Atlas	617
Seine	10153	23	Jesup L	612
Orygun	10050	24	Duramax	609
Jesup L	9983	25	Savory	606
Au Triumph	9946	26	Jesup Max Q	603
Jesup Max Q	9944	27	Seine	602
Teton	9939	28	Hymark	594
Bariane	9818	29	Ranger	594
Savory	9794	30	Martin 2	591
Hymark	9741	31	Teton	585
Martin 2	9694	32	Tower	585
Martin 2 647	9619	33	Au Triumph	579
Tower	9575	34	Martin 2 647	579
Ranger	9568	35	Orygun	577
Fawn	9475	36	Seine Happe	562
Bull	9406	37	Tower 647	556
Seine Happe	9305	38	Fawn	555
Tower 647	9087	39	Bull	546
Advance	8364	40	Advance	527
Mean	10287		Mean	631
LSD 0.10	935		LSD 0.01	62.3

Table 10. FORVAL per acre and GRASVAL per acre for tall fescue variety trial, 2013, Chazy, NY. Values are a sum of all three cuts.

	FORVAL/acre			GRASVAL/acre
Variety	Relative value	Rank	Cultivar	Relative value
Stockman	719	1	Courtenay	739
Barcel	708	2	Barcel	739
Courtenay	701	3	Kora	737
Rustler	700	4	Stockman	718
BarOptima PLUS E34	691	5	BarOptima PLUS E34	714
Barduram	690	6	Rustler	691
Kora	689	7	Montebello	688
Montebello	678	8	Barduram	687
KY-31	676	9	Siberia	662
Enforcer	668	10	Goliath	662
Goliath	656	11	Bronson	658
Enhance	646	12	Enhance	658
Duramax Armor	646	13	Duramax Armor	656
Kentucky 32	643	14	Fuego	655
Bronson	641	15	KY-31	651
Bariane	640	16	Kentucky 32	650
Festival	637	17	Enforcer	644
Cajun II	634	18	Bariane	641
Atlas	631	19	Savory	636
Siberia	629	20	Festival	631
Duramax	619	21	Tuscany II	627
Orygun	612	22	Atlas	617
Fuego	612	23	Hymark	613
Au Triumph	611	24	Jesup L	610
Tuscany II	610	25	Ranger	602
Seine	610	26	Cajun II	600
Savory	609	27	Duramax	599
Hymark	607	28	Seine	596
Jesup L	598	29	Jesup Max Q	593
Teton	597	30	Tower	576
Jesup Max Q	595	31	Au Triumph	569
Fawn	587	32	Teton	568
Tower	585	33	Seine Happe	564
Ranger	585	34	Martin 2	562
Martin 2	584	35	Orygun	561
Martin 2 647	579	36	Martin 2 647	553
Seine Happe	578	37	Advance	549
Bull	577	38	Tower 647	546
Tower 647	555	39	Bull	544
Advance	522	40	Fawn	536
Mean	629		Mean	627
LSD 0.10	55.3		LSD 0.10	62.7