2020 Michigan Forage Variety Test Report

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Forage crops are essential components of diversified agricultural production systems in Michigan. They provide feed for livestock, fix nitrogen for crop rotations, reduce soil erosion, improve soil structure, fertility and water retention, protect water quality, provide habitat for wildlife, generate biomass for fuel conversion, and add eye appeal to landscapes. Competition from row crops for land use continues to squeeze forage production acres while equipment, land, and labor costs increase. Michigan hay prices were good in 2020, and a one-ton increase of average quality alfalfa hay yield was worth $165 to $190/acre. Under these market conditions, the importance of improving yield per acre through use of better forage varieties is an important component of profitability. This report contains yield data from 2020. Yield data for individual cuttings from previous years are located in the variety test report archive on the MSU Forage Connection website at http://www.forage.msu.edu/publications.

2020 Conditions

Annual rainfall total and 30-year averages for April through October in East Lansing in southern Lower Michigan, and Chatham in the Upper Peninsula are in **Table 1**. Last winter was warmer than usual and the wet conditions that prevailed in the fall of 2019 continued into the spring. Temperatures were cool the first half of May and warmed up later in the month. Maturity of forages was a few days behind previous years. Grass trials were again harvested before alfalfa trials at East Lansing in 2020. Good yields were obtained through late July with the anticipation that there would be five cuttings of alfalfa and four cuttings of the cool season grass trials. Dry conditions in late July through early August slowed late summer regrowth in East Lansing. As a result, the next and final cut was not removed until October. Only four and three cuts total, respectively, were taken from the alfalfa and grass trials. Rainfall was timely and above normal at Chatham throughout the summer, and the dry period that typically occurs in late summer did not occur. First cutting was on schedule at Chatham. Yields were above average and higher than in recent years. Good to excellent second cutting yields and good third cutting yields were obtained in 2020.

2020 Alfalfa Trials

Long-term yield summaries for alfalfa varieties planted at multiple locations in Michigan variety trials from 2012 to 2019 are listed in **Tables 4 through 6**.

Alfalfa trials were cut four times in **East Lansing** in 2020 (June 3 – 6, July 1, July 29, and October 6, **Tables 10 to 13)**. Yields from the 10 conventional varieties in the 2017 seeding at East Lansing averaged 4.21 and ranged from 3.57 to 4.77 tons/acre. The three Roundup Ready® varieties averaged 4.05 and ranged from 3.96 to 4.18 tons/acre. Fifteen conventional varieties were seeded in 2018 and the average total yield was 4.88 and ranged from 3.96 to 4.96 tons/acre. The 2018 trial was irrigated in mid-August to improve yield during the late summer. A new trial of 20 conventional varieties was established at East Lansing in 2019. First-year average total yield in this trial was 5.00 and ranged from 4.67 to 5.33 tons/acre. A new alfalfa variety trial was seeded in East Lansing in August 2020 and will be harvested from 2021 through 2023.

Alfalfa trials were cut three times in **Chatham** in the Upper Peninsula in 2020 (June 24, July 29, and October 6, **Tables 14 to 16**). Trials of both conventional and Roundup Ready® alfalfa varieties were seeded at Chatham in 2018. Average yield with three cuttings of the varieties in the conventional seeding was 5.41 and ranged from 5.14 to 5.73 tons/acre. Yields of the four varieties in the Roundup Ready® seeding averaged 4.78 and ranged from 4.69 to 4.88 tons/acre. The yields from the 2018 trial are the highest yields of alfalfa reported from Chatham in several years. A trial of nine conventional alfalfa varieties was established at Chatham in 2019. Total yield in 2020 of these varieties averaged 4.25 and ranged from 3.67 to 4.70 tons per acre. In addition, one experimental variety of falcata entered in the 2019 trial was cut 3 times and produced 3.98 tons per acre in 2020.

2020 Red Clover Trials

A red clover trial was seeded in 2018 in late summer. This trial was not cut in the seeding year and was harvested for yield four times in 2019. The trial was harvested four times in 2020. Cutting dates were: June 3, July 14, Aug 19, and Nov 5, respectively. Yields of red clover varieties in the 2018 seeding averaged 3.30 and ranged from 3.05 to 3.46 tons/acre. The 'common' red clover entry was dead after the third cut in 2019 and not reported in 2020 data. More than 80% of the seasonal yield was in the first two cuttings. Yields of the remaining varieties in 2020, per cut and total, are listed in **Table 17**. A new red clover trial was seeded at East Lansing in early August 2020.

2020 Perennial Grass Trials

Cool-season grass trials at East Lansing were harvested three times in 2020. A brief description of grass species with a summary of management recommendations is in **Table 2**. Long-term yield summaries for grass varieties seeded in Michigan trials from 2014 to 2018 are reported in **Tables 8 and 9**. Date of maturity at first cutting are listed in **Table 10**. Yields for individual cuttings in 2020 and the previous year's total yields years are in **Tables 18 to 20**. Yield data for individual cuttings from previous years are located in the variety test report archive on the MSU Forage Connection website at http://www.forage.msu.edu/publications.

Perennial grass variety trials seeded in 2017 and 2018 at East Lansing were evaluated in 2020. Grass varieties included: fescue (tall, meadow); ryegrass (perennial and ryegrass type festulolium); orchardgrass; and timothy. New perennial grass variety trials of smooth bromegrass, orchardgrass, meadow fescue, tall fescue, perennial ryegrass, and timothy were planted at both East Lansing and Chatham in 2020.

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Table 1. Actual and 30-year average precipitation (Inches) from April to October 2013 to 2020 at two variety test sites in Michigan.									
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Avg**
	East Lansing								
Apr	7.78	1.07	1.10	1.22	5.17	2.18	2.29	2.78	**2.87**
May	4.35	3.66	4.83	2.97	2.47	4.96	3.80	4.99	**3.18**
June	5.23	5.60	7.23	0.97	2.30	1.60	7.52	2.46	**3.67**
July	2.49	2.97	2.89	3.76	2.30	2.18	2.55	2.90	**3.13**
Aug	5.74	5.33	6.15	6.83	1.99	4.21	1.16	2.69	**3.69**
Sept	0.89	4.49	4.34	3.47	1.26	3.48	3.60	4.09	**3.61**
Oct	5.24	2.41	1.92	3.70	8.15	5.66	6.03	2.77	**2.75**
Total	**31.72**	**25.53**	**28.46**	**22.92**	**23.64**	**24.27**	**26.95**	**22.68**	**22.90**
	Chatham								
Apr	3.30	3.32	2.03	3.21	5.25	2.02	2.56	1.91	**2.15**
May	2.20	3.36	5.60	3.45	4.99	1.36	5.53	1.60	**3.05**
June	2.77	3.85	2.67	2.34	7.36	4.48	2.52	5.11	**3.02**
July	4.78	4.27	2.15	3.44	1.74	5.08	1.42	7.65	**3.41**
Aug	2.68	3.18	1.86	3.67	5.50	4.32	2.70	3.82	**3.17**
Sept	2.71	3.53	2.41	4.78	3.26	5.40	5.08	3.53	**4.21**
Oct	3.06	6.98	4.25	6.90	7.82	8.02	7.25	5.29	**4.47**
Total	**21.50**	**28.49**	**20.97**	**27.79**	**35.92**	**30.68**	**27.06**	**28.91**	**23.48**

Grass trials at East Lansing were harvested before the alfalfa trials in 2020. Cutting dates in East Lansing were: cut 1 – May 30-31, cut 2 – July 23-25, and cut 3 was in early October. Yields at East Lansing were highest in the first cutting and lowest in the third and final cut. In general, percent yield per cutting of fescue (tall and meadow) and orchardgrass was about 53, 32, and 15 percent, respectively. Percent yield by cutting of timothy, ryegrass, and festulolium, respectively, were 60, 30, and 10 percent per cutting due to the low yields in the final cut.

In 2017, 6 perennial ryegrass, 1 festulolium (ryegrass type), 3 tall fescue, 3 meadow fescue, 3 orchardgrass, and 2 timothy varieties, respectively, were seeded at East Lansing. The perennial ryegrass varieties averaged 1.67, ranging from 1.49 to 1.85 tons/acre. One festulolium variety yielded 2.37 tons/acre. Tall fescue average yield was 3.07 and ranged from 2.88 to 3.35, meadow fescue average was 2.47 and ranged from 2.31 to 2.61, orchardgrass average was 2.76 and ranged from 2.68 to 2.89, and timothy yielded 2.79 and 3.29 tons per acre, respectively.

In 2018, perennial ryegrass, festulolium (ryegrass type), tall fescue, meadow fescue, and timothy varieties were seeded in trials at East Lansing. Dry matter yield of tall fescue averaged 3.14 and ranged from 2.71 to 3.58, meadow fescue yields averaged 2.61 and ranged from 2.54 to 2.75, timothy average yield was 2.75 and ranged from 2.38 to 3.31, the perennial ryegrass average yield was 1.67 and ranged from 1.46 to 2.06, festulolium (ryegrass-type) varieties yield average was 2.53 and ranged from 2.45 to 2.67 tons/acre, respectively.

Grass varieties may be marketed as early, medium, or late maturing. Grass maturity should be matched to legume maturity when planting in mixtures. Heading dates for first cutting in 2020 are reported in **Table 10**. Heading date is recorded when heads of 50% of the flowering tillers have cleared the flag leaf. A variety that does not reach 50% heading before the harvest date is rated as vegetative.

2020 Annual Forage Trials

Annual forages may provide a quick source of a forage in a year where forage may in short supply. Previous trials have evaluated primarily annual and Italian ryegrass. In 2020, separate trials with ryegrass, crabgrass, teffgrass, and winter small grains were established.

Italian and Annual Ryegrass . A trial of Italian and annual ryegrass was planted at East Lansing in early August 2019 and harvested once in October 2019. These varieties were harvested three times in 2020. Cutting dates were: May 25, June 25, and Aug 5. Seven varieties (experimental and commercial) of Italian and annual ryegrass averaged 3.59 tons/acre, ranging from 2.98 to 3.96. More than 85% of the total yield was obtained in the first two cuttings. The third cut was low due to dry conditions in mid-summer with little growth in late summer. Date of heading in first cut and yield (per cut and total) are listed in **Table 21**.

Teffgrass & Crabgrass. Two varieties each of teffgrass and crabgrass were evaluated for yield at both East Lansing and Chatham in 2020. These plots were seeded in mid-June at both locations. Teffgrass and crabgrass species do not survive the winter and are killed with the first freeze. Final cutting for both species at East Lansing and the teffgrass at Chatham was shortly after a frost. Yields of teffgrass and crabgrass are listed in **Table 22**.

Winter Triticale and Hybrid Rye. Trials of winter triticale and hybrid rye were seeded at East Lansing in late September in 2019. This study was harvested at the late boot/early heading stage of maturity in mid-May 2020. Harvest maturity of the winter small grains was about two weeks later in2020 than in 2019. The hybrid rye varieties matured a few days earlier than the triticale. The rye trial was harvested on May 20 and triticale was harvested on May 24. Dry matter yields of winter triticale varieties averaged 5.08 and ranged from 4.78 to 5.39 tons/acre. Yields of the hybrid rye varieties averaged 4.60 and ranged from 3.91 to 5.07 tons/acre. These varieties were cut once with little or no regrowth. Dry matter yields of the varieties entered are listed in **Table 23**.

Berseem Clover. Two released ('Frosty', 'Bigbee'), one VNS (variety not stated), and one experimental variety of berseem clover were planted in early August 2019 with 'common' red clover used as a check. Plots were harvested once in October 2019 and twice in 2020. Average yield in the seeding year was 0.62 tons/acre (0.52 to 0.80) and similar to red clover yield. Winter survival stand ratings in the spring of 2020 showed 'Frosty' with 83% stand survival and 'Bigbee' with 33% survival. The experimental variety and VNS berseem had less than 2% stand survival. The 'common' red clover was rated as 100% stand survival in the spring with no winter loss. Yield from 2 cuttings in 2020 Red Clover yield was higher than Frosty and both were higher than Bigbee in cut 1. Second-cut yields were similar among the three surviving entries. Total yield was similar between red clover and Frosty in 2020. Dry weather after cut two resulted in very little growth the remainder of the growing season. Yield and percent stand data from all 4 berseem entries and the red clover check are listed in **Table 24**.

METHODS

Plots are managed to provide optimum fertility and pest control. All plots are planted into prepared seedbeds using a cultipacker seeder. Alfalfa, red clover, and berseem clover plots are 3 feet wide and 20-23 feet long. Grass plots are 20-23 feet long and 5 feet wide. Annual grass plots measure 15-20 ft long x 5 ft wide. Only the center 3 ft of 5-ft-wide plots is harvested.

Phosphorus, potassium and sulfur are applied according to soil test and MSUE recommendations for the species. Perennial and annual grass plots receive 50 lb of N in spring and again after first cutting. Spring small grains receive 100 lb N topdressed after emergence, while winter small grain plots receive 50 lb N at planting and 100 lb in spring. Weeds and insects are controlled as needed. Plots may be irrigated if needed to prevent establishment failure but are not irrigated during production years. This provides information about variety resilience to variation in precipitation.

The number of harvests per year depends on species, location, and weather. Intensive five-cut alfalfa systems are possible in southern counties, but it is rarely practical to get more than three alfalfa cuts in the Upper Peninsula. Grasses regrow more slowly and provide fewer cuttings than alfalfa. Harvest targets are late bud for alfalfa, early bloom for red clover and grasses, and flag leaf for small grains. Tests are harvested using a forage plot flail harvester set at 4 inches stubble height.

Test varieties are provided by breeders, seed marketers, or others with an interest in variety performance. Both released and experimental varieties may be entered.

Check varieties are included in most tests. These provide reference points for estimation of relative differences among tests conducted across different years. The relative difference among varieties is expressed as a **percentage of the check** variety yield. Check varieties are chosen for suitability across a wide area of the USA. Where meaningful check varieties are not available, relative differences are expressed as a **percentage of the test average**.
The reliability of variety rankings increases with the number of environments (i.e. the number of tests) in which the variety has been tested.

Statistical comparisons allow accurate separation of true genetic effects from random variation attributed to field or weather conditions within an individual test. The **Least Significant Difference (LSD)** is the key statistic for comparing two varieties. When the difference in average yield between two varieties is greater than the LSD value, the varieties are likely to be truly different. The **Coefficient of Variation (CV)** provides an estimate of overall procedural and environmental variability in a test or cutting. When CV is greater than 10%, it can be difficult to detect genetic differences in variety performance. High CV can be related to low yields and environmental stress.

FORAGE SPECIES INFORMATION

A summary of characteristics and management recommendations for tested forage species are included in **Table 2.** Appropriate species and variety selection depends on location, desired stand life, cutting management, yield goal, and forage quality goal. When selecting a forage to plant on a particular site, first consider adaptation of the ***species*** to the conditions of the proposed site and intended use as hay/haylage or pasture. Only then should individual varieties and desired yield come under consideration. For more details on individual forage species, see MSUE Bulletin E-3309, *Recommended Hay and Pasture Species for Michigan*.

Alfalfa is the prevalent perennial forage in Michigan.. Plant breeders, developers, and marketers submit alfalfa varieties for evaluation. Varieties are evaluated for yield and persistence for three full years after the seeding year. Vernal, a highly fall-dormant (FD 2) public variety released in 1953 with poor disease resistance compared to modern varieties, is used as the historical check variety to maintain long-term comparisons across time. An index value for variety yield as a percent of Vernal is presented for each conventional alfalfa entry. Roundup-Ready (RR) entries were planted in separate tests prior to2019 to allow use of glyphosate. Because there is no industry standard check variety with the RR trait, index values in RR alfalfa tests are presented as a percentage of the test average.

Ratings for alfalfa plant traits are shown in **Table 3**. An alfalfa variety consists of a population of plants which are not genetically identical.. For disease traits, varieties are described according to the mean response of all plants, such as average yield, and as a frequency of certain types of plants, such as the percentage of plants resistant to some pest or disease. Thus, even in a "resistant" variety, only a portion of the plants will be disease resistant. For example, moderate resistance means that 15 to 30% of the established plants are resistant, leaving 70 to 85% susceptible. Therefore, a variety classified as resistant may still suffer damage from a disease, especially in the seedling stage. Moderate resistance is generally considered adequate in Michigan. More information on alfalfa diseases can be found online at *www.alfalfa.org/pdf/AlfalfaAnalyst.pdf.*

Fall dormancy (FD) ratings are determined by the amount of regrowth after a mid-September cutting. They depend on alfalfa response to daylength and temperature and are useful as an indicator of growth rate potential after cutting or winter dormancy. Moderately dormant (FD = 5) varieties grow earlier in the spring and later in the fall, grow back faster at every cutting, mature a few days earlier, and often yield more than dormant (FD =3-4) or very dormant (FD = 1-2) varieties in the East Lansing test. The yield advantage of FD5 is much less at the Lake City and UP test locations, but tested FD5 varieties with adequate WSI have been persistent in our northern tests. Varieties chosen for short-term, intensively managed stands in southern to mid-Michigan (three to four years) should be: dormant to moderately dormant (FD= 4-5). In northern Michigan and the UP, FD 3-5-is recommended. Non-dormant alfalfa varieties (FD = 6-11) are not recommended for use in Michigan except as an annual or cover crop where survival for more than one growing season is not expected.

Winter survival index (WSI) is the preferred rating system for evaluating winterhardiness of alfalfa varieties. A lower WSI value indicates better winterhardiness, and WSI of 1-2 is recommended for Michigan. Within a FD rating, varieties can differ considerably for winter survival index (WSI). The FD and WSI ratings for varieties in the Michigan tests are given in **Table 3.**
Roundup Ready (RR) varieties are resistant to the herbicide glyphosate (Roundup and many other trade names) which can simplify weed control during the critical alfalfa establishment phase.

Bacterial Wilt (BW). BW is present in all of Michigan and only resistant varieties should be grown.

Phytophthora Root Rot (PRR). This fungal disease, first found in Michigan in 1972, is now one of the state's most important alfalfa diseases and resistance is important when selecting varieties. PRR occurs primarily on heavy or poorly drained soils, but any soil may result in severe injury if saturated for seven to ten days, especially to one- to two-month old seedlings. Planting seed treated with Apron or Stamina fungicides may further reduce disease when planting resistant varieties. Treating a susceptible variety, such as Vernal, with a seed fungicide is unlikely to compensate for susceptibility. Most of the high yielding varieties in our tests are resistant to PRR.

Anthracnose (AN). This disease was first found in Michigan in 1976. It occurs during hot, moist summers and is most common in the southern third of Lower Michigan. The fungus infects stems and crowns and may kill some plants. We recommend that only anthracnose resistant varieties be planted in Michigan.

Verticillium Wilt (VW). First detected in Michigan in 1982, VW has not increased in severity as expected. It is generally introduced with infected seed and is usually not a problem until the third year, and then primarily in the first cutting. Therefore, resistance to VW is more important when stands are managed for stand life greater than 3 years. Growing alfalfa in rotation with corn will help break the disease cycle.

Aphanomyces (APH). *Aphanomyces euteiches* is a soil-borne fungus that is similar to PRR and thrives in cool-moist conditions. It can kill or severely stunt young seedlings and causes a chronic root disease in established plants. Seedlings infected with APH will have yellow leaves (chlorosis) and gray roots and stems. There are three races of APH. Race 1 and 2 are confirmed to be present in Michigan. Alfalfa resistant to race 2 is also resistant to race 1; however, resistance to race 1 does not infer resistance to race 2. Resistance to APH should be considered when establishing alfalfa in poorly drained areas. Apron fungicide does not control APH, but Stamina may be helpful.

Stem nematode (SN). *Ditylenchus dipsaci* is a microscopic pest that can become a problem in areas where alfalfa is grown for many years. Symptoms of nematode damage include stunted plants and club-like stems. Crop rotation is the best method for controlling stem nematode.

Table 2. Planting specifications and site/use suitability of tested forage species in Michigan

	Seeding rate (lb/acre) †	Seeds/lb (approx.)	Ease of establishment	Stand life (yr)	Acid	Wet	Drought	Cold	Heat	Pasture	Hay
PERENNIALS											
Alfalfa	12-16	213,000	Easy	3-5+	5††	5	2	1	2	2	1
Red Clover	8-12	262,000	Easy	2	4	2	4	1	3	2	2
Brome, meadow	15-20	93,000	Fair	5+	3	5	2	1	-	2	2
Brome, smooth	12-15	139,000	Slow	5+	2	5	2	1	2	2	1
Fescue, meadow	15-20	280,000	Easy	3-4	2	2	4	1	4	1	1
Fescue, tall	12-15	218,000	Easy	5+	1	2	1	3	1	1	1
Festulolium	20-30	207,000	Easy	2-3	3	2	3	2	5	1	3
Kentucky bluegrass	8-15	2,056,000	Easy	5+	2	3	5	1	5	1	5
Orchardgrass	10-15	536,000	Easy	3-5	3	3	2	2	3	2	1
Reed canarygrass	6-8	509,000	Slow	5+	2	1	1	1	3	3	2
Ryegrass, Annual/Italian	20-30	209,000	Easy	1	2	2	5	*	5	1	4
Ryegrass, perennial	20-30	278,500	Easy	2-5	2	2	5	4	5	1	5
Timothy	6-8	1,119,000	Easy	5+	2	2	5	1	3	3	1
ANNUALS											
Berseem clover	8-25	207,000	Easy	1-2	3	2	1	*	1	1	1
Crabgrass	3-5	800,000	Easy	1	3	4	2	5	1	1	3
Teff grass	6-10	1,226,000	Fair	1	3	2	2	5	1	4	1
Oats	64-80	17,800	Easy	1	1	3	4	4	4	1	1
Rye	60-120	17,000	Easy	1	1	3	2	1	4	1	1
Triticale	50-120	16,000	Easy	1	1	3	2	1	4	1	1

†Use lower end of range for drilling and higher end for broadcasting. Reduce rates proportionately when planting in mixtures.
††Suitability Rating: 1=excellent, 2=very good, 3=average, 4=fair, 5=poor, * = variety-dependent.

Table of Contents

Table 3. Fall dormancy (FD), winter survival index (WSI), and disease resistance ratings for alfalfa cultivars in MSU variety trials

Variety	FD †	WSI††	BW ‡	PRR	AN	VW	FW	Aph 1	Aph 2	SN	RR	PLF	Multi	Salt	Stand	Marketer
1041-2	4	2	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Albert Lea
428RR	4	1	HR	HR	HR	HR	HR	HR	-	MR	RR	-	H	G	-	Allied Seed
430 RR LH	4	2	HR	HR	HR	HR	HR	HR	-	MR	RR	HR	H	-	-	Farm Science
6424R	4	2	HR	HR	HR	HR	HR	HR	HR	R	RR	-	H	-	-	NEXGROW
6497R	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	NEXGROW
6585Q	5	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	H	-	-	NEXGROW
9200 RR	4	1.5	HR	HR	HR	HR	HR	HR	-	-	RR	-	-	-	-	LG Seeds
9401	4	2	HR	HR	HR	HR	HR	HR	-	R						Albert Lea
AFX 429	3	-	HR	HR	HR	HR	HR	HR	R	R	-	-	L	-	-	Alforex Seeds
AFX 469	4	-	HR	HR	HR	HR	HR	HR	-	HR	-	-	L	G	-	Alforex Seeds
AFX 460	4	2	HR	HR	HR	HR	HR	HR	R	R	-	-	-	-	-	Alforex Seeds
AmeriStand 403T Plus	4	2	HR	HR	HR	HR	HR	HR	R	MR	-	-	-	-	-	America's Alfalfa
AmeriStand 455TQ RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	America's Alfalfa
Armour	4	2	HR	HR	HR	HR	HR	HR	-	-	RR	-	-	-	-	Becks Hybrids
Caliber	4	2	HR	HR	HR	HR	HR	HR	MR	MR	-	-	-	-	-	Becks Hybrids
CavalryDQ	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Becks Hybrids
Contender	5	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Becks Hybrids
DG 4210	4	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Crop Production
DKA40-51RR	4	1	HR	HR	HR	HR	HR	HR	HR	R	RR	-	-	-	-	Dekalb
DKA41-18RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Dekalb
DKA43-22RR	4	2	HR	HR	HR	HR	HR	HR	R	HR	RR	-	H	-	-	Dekalb
DKA44-16RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	Dekalb
Emerald	4	1	HR	HR	HR	HR	R	HR	HR	R	-	-	-	-	-	TriCal
Enduro Elite	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Cisco Seeds
FF42.A2	4	1.9	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Lacrosse
Finch	5	2	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Blue River Organics
Fierce	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Becks Hybrids
ForageGold	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	M	-	-	Renk Seed
Fortune	4	-	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	DLF International
FSG 403LR	4	2	HR	HR	HR	HR	HR	HR	R	R	-	-	-	-	R	Farm Science
FSG 415 BR	4	2	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	-	Farm Science
FSG 424	4	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	H	G	-	Farm Science
FSG 426	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	H	-	-	Farm Science
GA 409	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Pref Alfalfa Gen
GA 497 HD	5	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Pref Alfalfa Gen
Hi-Gest 360	3	1.5	HR	HR	HR	HR	HR	HR	HR	R	-	-	M	G	-	Alforex Seeds
HybriForce 3400	4	1.5	HR	HR	HR	HR	HR	HR	MR	HR	-	-	-	-	-	Dairyland Seeds
HybriForce 3400QR	4	1.5	HR	HR	HR	HR	HR	HR	MR	-	-	-	-	-	-	Dairyland Seeds
HybriForce 3420 Wet	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Dairyland Seeds
HybriForce 3420/Wet-OB1	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Osprey Biotechnics
HybriForce 3420/Wet-OB2	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Osprey Biotechnics
HybriForce 3430	4	-	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	-	Dairyland Seeds
HybriForce 4400	4	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Dairyland Seeds
HybriForce 4400-OBT2002	4	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Osprey Biotechnics
HybriForce 4400-OBT2013	4	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Osprey Biotechnics

Table 3 continued next page

Table 3 continued

Variety	FD †	WSI††	BW ‡	PRR	AN	VW	FW	Aph 1	Aph 2	SN	RR	PLF	Multi	Salt	Stand	Marketer
HybriPro BR	5	-	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Hyland Seeds
Integra 8420	4	-	HR	HR	HR	HR	HR	HR	HR	HR	-	-	M	-	-	Wilbur-Ellis
Integra 8444R	4	-	HR	HR	HR	HR	HR	HR	HR	HR	RR	-	M	G/F	-	Wilbur-Ellis
Integra 8450	4	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Wilbur-Ellis
KF406A2	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Byron Seeds
KF425HD	5	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Byron Seeds
L455HD	4	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Legacy Seeds
LegenDairy XHD	3	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	H	G	-	Croplan Genetics
Magnitude	4	1	HR	HR	HR	HR	HR	HR	-	HR	-	-	H	G	-	Allied Seed
Magnum 7 WET	4	1.6	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Dairyland Seeds
Mariner IV	4	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Allied Seed
Octane	3	1.4	HR	HR	HR	HR	HR	HR	HR	-	-	-	L	-	-	Brett Young
Oneida VR	3	-	R	MR	MR	HR	HR	-	-	-	-	-	-	-	-	Public
PGI 529	5	2	HR	HR	HR	HR	HR	-	-	R	-	-	M	-	-	Alforex Seeds
Pioneer 54Q14	4	1	HR	HR	HR	HR	HR	HR	R	MR	-	-	-	-	-	Pioneer
Pioneer 54Q32	4	-	HR	HR	HR	HR	HR	HR	-	LR	-	-	-	-	-	Pioneer
Pioneer 55Q27	5	1	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Pioneer
Pioneer 55QR04	4	1	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Pioneer
Pioneer 55V12	5	-	R	HR	HR	HR	HR	HR	R	R	-	-	-	-	R	Pioneer
Pioneer 55V50	5	-	HR	HR	HR	HR	R	HR	HR	R	-	-	-	-	-	Pioneer
Pioneer 55VR06	5	1	HR	HR	HR	HR	R	HR	MR	MR	RR	-	-	-	-	Pioneer
Pioneer 55VR08	5	-	HR	HR	HR	HR	HR	HR	HR	R	RR	-	-	-	-	Pioneer
Quail	5	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Blue River Organics
Rebound 6XT	4	1	HR	HR	HR	HR	HR	HR	HR	-	-	-	H	-	-	CropLan Genetics
RR AphaTron 2XT	4	1	HR	HR	HR	HR	HR	HR	HR	-	RR	-	H	G	-	CropLan Genetics
RR Stratica	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	Croplan Genetics
RR501	5	2	HR	HR	HR	-	HR	HR	-	HR	RR	-	H	G/F	-	Channel
SolarGold	4	2	HR	HR	HR	HR	HR	HR	MR	MR	-	-	H	-	-	Renk Seed
StarGold	5	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Renk Seed
Stalwart II	5	1.5	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	LG Seeds
Swift	4	2	HR	HR	HR	HR	R	R	MR	HR	-	-	-	-	-	Blue River Organics
SW 3407	3	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	S&W Seeds
SW 4107	4	-	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	S&W Seeds
SW 5213	5	-	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	S&W Seeds
SW 5511	5	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	S&W Seeds
TriFecta	5	2	HR	HR	HR	HR	R	HR	HR	MR	-	-	-	-	-	TriCal
Triad	5	2.5	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Albert Lea
Vernal	2	2	R	S	S	S	MR	S	-	S	-	-	-	-	-	Public
WL 349 HQ	4	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	W-L Research
WL 354 HQ	4	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	H	-	-	W-L Research
WL 356 HQ RR	4	1	HR	HR	HR	HR	HR	HR	HR	HR	RR	-	H	G	-	W-L Research
WL 365 HQ	5	1	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	W-L Research
WL 372 HQ RR	5	2	HR	HR	HR	HR	HR	HR	-	HR	RR	-	-	-	-	W-L Research
Yieldmaster RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Monsanto

† Refer to Alfalfa Trait Ratings found in the summary for more information

†† Winter survival index : 1=superior winter survival, 2=very good, 3=good, 4=adequate, 5=low, 6=no winter survival.

‡ BW = Bacterial Wilt, PRR = Phytophthora Root Rot, AN = Anthracnose, VW = Verticillium Wilt, FW = Fusarium Wilt,
APH 1 = Aphanomyces race one, APH 2 = Aphanomyces race two, SN=Stem nematode, RR = Roundup Ready® Alfalfa Variety, PLF = Potato leafhopper resistance, Multi = Multifoliate leaf expression (H-High, M-Medium, L-Low), Salt = Salt tolerance (G = germination, F = Forage), Stand = Standability or lodging resistance.

Table 4. Long-term yield averages (dry matter tons/acre) from MSU Alfalfa Variety Trials.
Seeded in East Lansing, Michigan from 2012 to 2019

Variety	Marketer	2012 (2013-15)	2013 (2014-16)	2014 (2015-17)	2015 (2016-18)	2016 (2017-19)	2017 (2018-20)	2-year average 2018 (2019-20)	1-year total 2019 (2020)	(Trials) † % Vernal ††
		dry matter tons/acre								
1041-2	Albert Lea	-	-	-	-	-	-	-	5.05	-
6585Q	NEXGROW	-	6.13	-	-	-	-	-	-	(1)117
9401	Albert Lea	-	-	-	-	-	-	-	4.67	-
AFX 429	Alforex Seeds	-	-	-	-	-	4.56	-	-	(1)105
AFX 469	Alforex Seeds	-	-	-	-	-	4.75	-	-	(1)110
AFX 460	Alforex Seeds	-	-	-	-	-	4.77	4.49	-	(2)106
Caliber	Becks Hybrids	-	-	5.81	4.33	-	-	-	-	(2)110
CavalryDQ	Becks Hybrids	-	-	-	5.02	-	4.67	-	-	(2)118
Contender	Becks Hybrids	6.21	-	5.80	4.64	-	-	-	-	(3)112
DG 4210	Crop Production	-	6.16	-	-	-	-	-	-	(1)118
Emerald	TriCal	-	-	-	-	-	-	4.62		(1)105
Enduro Elite	Cisco Seeds	-	-	5.73	-	-	-	-	-	(1)109
FF42.A2	Lacrosse Seeds	-	-	-	5.05	-	-	-	-	(1)129
Fierce	Becks Hybrids	-	-	5.86	4.94	-	4.49	-	-	(3)114
Finch	Blue River Organic	-	-	-	-	-	-	-	4.92	-
ForageGold	Renk Seed	5.79	-	-	-	-	-	-	-	(1)100
Fortune	DLF International	-	-	-	-	5.34	-	-	-	(1)120
FSG 415 BR	Farm Science	-	-	-	5.33	-	-	-	-	(1)136
FSG 403LR	Farm Science	-	6.04	-	-	-	-	-	-	(1)115
FSG 424	Farm Science	-	6.30	-	-	-	-	-	-	(1)120
FSG 426	Farm Science	-	-	-	4.74	-	-	-	-	(1)121
GA-409	Preferred Alfalfa Gen	-	-	5.79	-	-	-	-	-	(1)110
GA-497HD	Preferred Alfalfa Gen	-	-	-	-	5.23	-	-	-	(1)118
HybriForce 3400	Dairyland Seed	7.00	6.43	-	4.73	-	-	-	-	(3)121
HybriForce 3400 QR	Dairyland Seed	6.63	-	-	-	-	-	-	-	(1)114
HybriForce 3420 Wet	Dairyland Seed	-	-	-	-	5.41	-	-	-	(1)122
HybriForce 3420/Wet-OB1	Osprey Biotechnics	-	-	-	-	5.46	-	-	-	(1)123
HybriForce 3420/Wet-OB2	Osprey Biotechnics	-	-	-	-	5.83	-	-	-	(1)131
HybriForce 3430	Dairyland Seed	-	-	-	-	5.49	-	-	-	(1)123
HybriForce 4400	Dairyland Seed	-	-	-	4.94	5.48	5.19	5.22	5.06	(4)122
HybriForce 4400-OBT2002	Osprey Biotechnics	-	-	-	-	-	-	5.08		(1)116
HybriForce 4400-OBT2013	Osprey Biotechnics	-	-	-	-	-	-	4.96		(1)113
HybriPro BR	Hyland Seeds	-	-	5.68	-	-	-	-	-	(1)108
Integra 8420	Wilbur-Ellis	-	-	-	-	5.47	-	-	-	(1)123
Integra 8450	Wilbur-Ellis	-	-	-	-	5.54	-	-	-	(1)124
KF406A2	Byron Seed	-	-	-	-	5.31	-	-	-	(1)119
KF425HD	Byron Seed	-	-	-	-	5.37	-	-	-	(1)121
L455HD	Legacy Seeds	-	5.98	-	-	-	-	-	-	(1)114
LegenDairy XHD	Croplan Genetics	-	6.20	-	-	-	-	-	-	(1)119
Magnitude	Allied Seed	6.49	-	-	-	-	-	-	-	(1)112
Mariner IV	Allied Seed	6.31	-	-	-	-	-	-	-	(1)109
Oneida VR	public	-	5.53	5.33	-	4.68	-	-	-	(3)104
PGI 529	Alforex	-	6.66	-	-	-	-	-	-	(1)127
Pioneer 54Q14	Pioneer	-	-	5.54	-	-	-	-	-	(1)106
Pioneer 54QR04	Pioneer	-	5.95	-	-	-	-	-	-	(1)114
Pioneer 55Q27	Pioneer	-	6.38	6.13	4.96	5.22	-	-	-	(4)121
Pioneer 55V12	Pioneer	6.08	-	-	-	-	-	-	-	(1)105
Pioneer 55V50	Pioneer	6.95	6.59	-	-	-	-	-	-	(2)123
Prolific II	Hyland Seeds	-	-	5.64	-	-	-	-	-	(1)107
Quail	Blue River Organic	-	-	-	-	-	-	-	4.78	-
Rebound 6XT	Croplan Genetics	-	-	-	-	5.10	-	-	-	(1)115
SolarGold	Renk Seed	6.31	-	-	-	-	-	-	-	(1)109
Stalwart II	LG Seeds	-	-	-	-	5.14	-	-	-	(1)116
StarGold	Renk Seed	-	-	6.17	-	-	-	-	-	(1)118
SW 3407	S & W Seed Company	-	-	-	-	-	-	-	5.20	-
SW 4107	S & W Seed Company	-	-	-	-	-	4.91	4.91	4.93	(2)113
SW 5213	S & W Seed Company	-	-	-	-	5.51	-	-	-	(1)124
SW 5511	S & W Seed Company	-	-	-	-	-	-	-	4.97	-
Triad	Albert Lea	-	-	-	-	-	-	-	4.62	-
TriFecta	TriCal	-	-	-	-	5.52	-	5.01		(2)119
Vernal	public	5.80	5.23	5.25	3.93	4.45	4.33	4.39	4.74	(7)100
WL365HQ	W-L Research	-	-	-	-	5.32	-	-	-	(1)120
WL 349 HQ	W-L Research	-	-	-	-	-	-	-	4.97	-
Mean		**6.36**	**6.12**	**5.73**	**4.78**	**5.31**	**4.71**	**4.84**	**4.89**	**114**

† Number of 3-year trials with at least 2 years of data after the seeding year.
†† Average % Vernal of varieties with more than 2 full years of yield data
‡ Seeding year and (the years the trial was harvested to obtain the average yield)

Table 5. Yields of Alfalfa Varieties (dry matter tons/acre) seeded from 2012 to 2019 at Chatham in the Upper Peninsula and at Lake City in Northern Lower Michigan.

		Chatham						Lake City					
		3-year average ‡			2-year	1-year	(Trials) †	3-year average ‡					(Trials) †
		2012	2013	2015	2018	2019	%	2012	2013	2014	2015	2016	%
Variety	Marketer	(2013-15)	(2014-16)	(2016-18)	(2016-18)	(2020)	Vernal ††	(2013-15)	(2014-16)	(2015-17)	(2016-18)	(2017-19)	Vernal ††
		---------- dry matter tons/acre ----------						---------- dry matter tons/acre ----------					
1041-2	Albert Lea	-	-	-	-	4.70	-	-	-	-	-	-	-
9401	Albert Lea	-	-	-	-	4.52	-	-	-	-	-	-	-
AmeriStand 403T Plus	America's Alfalfa	-	-	3.29	-	-	(1)105	-	-	3.18	4.36	-	(2) 96
DG 4210	Crop Production	-	3.74	3.28	-	-	(2)102	-	2.58	3.35	4.53	-	(3)100
ForageGold	Renk Seed	3.13	-	-	-	-	(1) 98	3.89	-	-	-	-	(1) 95
Hi-Gest 360	Alforex	-	-	-	-	-	-	-	-	3.40	-	-	(1) 97
HybriForce 3400	Dairyland Seed	-	-	3.45	4.23	-	(2)107	4.31	-	3.65	4.91	-	(3)108
HybriForce 4400	Dairyland Seed	-	-	-	4.27	4.37	(1)106	-	-	-	-	-	-
Integra 8420	Wilbur-Ellis	-	-	-	4.01	-	(1) 99	-	-	-	-	3.48	(1)103
Integra 8450	Wilbur-Ellis	-	-	-	4.03	-	(1)100	-	-	-	-	3.44	(1)102
L455HD	Legacy	-	-	3.20	-	-	(1)102	-	2.77	3.83	4.48	-	(3)107
Magnum 7 WET	Dairyland	-	-	3.13	-	-	(1)100	-	-	3.62	4.67	-	(2)105
Mariner IV	Allied Seed	3.13	-	3.14	-	-	(2) 99	-	-	3.81	4.76	-	(2)109
Octane	Brett Young	-	-	-	-	-	-	-	-	3.46	-	-	(1) 99
Oneida VR	Public	-	-	3.13	-	-	(1)100	-	2.61	3.62	4.63	-	(3)104
Pioneer 54Q14	Pioneer	-	-	-	-	-	-	-	-	3.20	4.45	-	(2) 97
Pioneer 54Q32	Pioneer	-	-	-	-	-	-	3.99	-	-	-	-	(1) 98
Pioneer 54QR04	Pioneer	-	-	-	-	-	-	-	2.56	-	-	-	(1)100
Pioneer 55Q27	Pioneer	-	-	3.31	-	-	(1)105	-	2.59	3.81	4.48	3.39	(4)104
Pioneer 55V12	Pioneer	3.31	-	-	-	-	(1)100	3.98	-	-	-	-	(1) 98
Pioneer 55V50	Pioneer	3.56	3.66	-	-	-	(2)108	4.09	2.73	3.79	4.83	-	(4)107
Prolific II	Hyland Seeds	-	-	3.28	-	-	(1)104	-	-	3.81	4.72	-	(2)109
SolarGold	Renk Seed	3.61	-	-	-	-	(1)113	3.90	-	-	-	-	(1) 96
StarGold	Renk Seed	-	-	3.27	-	-	(1)104	-	-	3.48	-	-	(1)100
SW 3407	S & W Seed	-	-	-	-	4.13	-	-	-	-	-	-	-
SW 5511	S & W Seed	-	-	-	-	3.86	-	-	-	-	-	-	-
SW 4107	S & W Seed	-	-	-	3.87	4.32	(1) 96	-	-	-	-	-	-
Swift	Blue River Organic	-	-	-	-	4.45	-	-	-	-	-	-	-
Triad	Albert Lea	-	-	-	-	3.67	-	-	-	-	-	-	-
Trifecta	TriCal	-	-	-	4.02	-	(1)100	-	-	-	-	-	-
Vernal	Public	3.19	3.53	3.14	4.04	4.21	(4)100	4.08	2.55	3.49	4.36	3.37	(5)100
WL354HQ	W-L Research	-	-	3.08	-	-	(1) 98	-	-	3.11	-	-	(1) 89
Mean		**3.32**	**3.64**	**3.23**	**4.07**	**4.25**	**102**	**4.03**	**2.63**	**3.54**	**4.60**	**3.42**	**102**

† Number of 3-year trials with at least 2 years of data after the seeding year.

†† Average % Vernal of varieties with more than 2 full years of yield data

‡ Seeding year and (the years the trial was harvested to obtain the average yield)

Table 6. Yields of Roundup Ready® Alfalfa Varieties (dry matter tons/acre) seeded from 2013 to 2018 at East Lansing, Chatham, and Lake City, Michigan .

		East Lansing						Chatham				Lake City				
		Three-year average ††					(Number)	Three-year ††		2-year	(Number)	Three-year average ††				(Number)
		2013	2014	2015	2016	2017	%	2013	2015	2018	%	2013	2014	2015	2016	%
Variety	Marketer	(2014-16)	(2015-17)	(2016-18)	(2017-19)	(2018-20)	Mean †	(2014-16)	(2016-18)	(2019-20)	Mean †	(2014-16)	(2015-17)	(2016-18)	(2017-19)	Mean †
		---------- dm tons/acre ----------						---- dm tons/acre ----				--------- dm tons/acre ---------				
428RR	Allied Seed	6.01	-	-	-	-	(1)102	-	-	-	-	-	-	-	-	-
430RRLH	Allied Seed	-	-	4.16	-	-	(1) 89	-	-	-	-	-	-	-	-	-
6424R	NEXGROW	-	-	-	-	4.45	(1) 97	-	-	3.60	(1)102	-	-	-	-	-
6497R	NEXGROW	5.94	-	-	-	-	(1)101	-	-	-	-	-	-	-	-	-
9200RR	LG Seeds	-	-	-	4.79	-	(1)101	-	-	-	-	-	-	-	-	-
AmeriStand 455TQ RR	America's Alfalfa	5.81	-	-	-	-	(1) 99	-	-	-	-	-	-	-	-	-
Armour	Becks Hybrids	-	-	-	-	4.78	(1)104	-	-	-	-	-	-	-	-	-
DKA40-51RR	Dekalb	-	5.10	4.80	4.49	-	(3) 98	-	2.83	3.55	(2) 97	-	2.88	3.59	3.17	(3) 96
DKA41-18RR	Dekalb	5.72	-	-	-	-	(1) 97	3.66	3.14	-	(2)102	2.83	-	3.84	-	(2)100
DKA43-22RR	Dekalb	-	5.20	-	-	-	(1)102	-	3.11	-	(1)103	-	3.10	4.06	-	(2)104
DKA44-16RR	Dekalb	5.99	5.24	4.52	4.75	4.53	(5)100	3.59	3.09	3.55	(3)101	2.85	3.04	3.87	3.23	(4)101
Integra 8444R	Wilbur-Ellis	-	-	-	4.61	-	(1) 97	-	-	3.48	(1) 98	-	-	-	3.03	(1) 95
Pioneer 54QR04	Pioneer	5.98	-	-	-	-	(1)102	-	-	-	-	2.84	-	-	-	(1)101
Pioneer VR06	Pioneer	-	5.40	5.16	-	-	(2)107	-	-	-	-	-	-	3.87	-	(1)101
Pioneer 55VR08	Pioneer	-	-	-	5.01	-	(1)106	-	-	-	-	-	-	-	3.36	(1)105
RR AphaTron 2XT	Croplan Genetics	-	-	-	4.81	-	(1)101	-	-	-	-	-	-	-	-	-
RR 501	Channel	-	5.26	-	-	-	(1)100	-	2.93	-	(1) 97	-	-	-	-	-
RR Stratica	Croplan Genetics	5.95	-	-	-	-	(1)101	-	-	-	-	-	-	-	-	-
WL 356HQ.RR	W-L Research	5.96	-	-	-	-	(1)101	-	-	-	-	-	-	-	-	-
WL 372HQ.RR	W-L Research	5.88	-	-	-	-	(1)100	-	-	-	-	-	-	-	-	-
Yieldmaster RR	Monsanto	5.70	-	-	-	-	(1) 97	3.64	-	-	(1)100	2.75	-	-	-	(1) 98
Mean		**5.89**	**5.24**	**4.66**	**4.74**	**4.59**		**3.63**	**3.02**	**3.55**		**2.82**	**3.01**	**3.85**	**3.20**	

Trials usually cut 4 times per year at East Lansing, three times per year at Lake City and Chatham.
† Number of trials at each location with at least 2 full harvest years of data and % of the mean.
†† Seeding year and (the years the trial was harvested to obtain the average yield)

Table 7. Long-term average yields (dry matter tons/acre) of perennial forage grasses seeded from 2014 to 2018 at East Lansing, Michigan.

			Multi-year averages ‡					%
			2014	2015	2016	2017	2018	species
Sp †	Variety	Marketer	(2015-17)	(2016-18)	(2017-19)	(2018-20)	(2019-20)	mean ††
			dm tons/acre					
FEST	Becva	DLF Pickseed	2.61	-	-	-	-	(1)106
FEST	Barfest	Barenbrug Seed	2.33	-	-	-	-	(1) 94
FEST	Hostyn	DLF Pickseed	-	-	-	-	4.43	(1)102
FEST	Lofa	DLF Pickseed	-	-	-	-	4.39	(1)101
FEST	Perun	DLF Pickseed	-	-	-	-	4.17	(1) 96
FEST	Federo	Albert Lea Seed	-	-	-	3.81	-	-
FEST	**SPECIES MEAN (ryegrass type)**		**2.47**	-	-	**-**	**4.33**	
FEST	Fojtan	DLF Pickseed	-	-	3.72	-	-	(1) 95
FEST	Mahulena	DLF Pickseed	-	-	4.11	-	-	(1)105
FEST	**SPECIES MEAN (fescue type)**		-	-	**3.92**	-	-	
OR	Barlegro	Barenbrug Seed	3.42	-	-	-	-	(1)100
OR	Echelon	DLF Pickseed	3.43	-	4.45	-	-	(2)104
OR	FSG506OG	Allied Seed	3.46	-	-	-	-	(1)101
OR	Intensiv	Barenbrug Seed	3.48	-	-	-	-	(1)102
OR	Lyra	Hood River Seed	-	-	4.00	-	-	(1) 96
OR	Lucharm	Albert Lea Seed	-	-	-	3.70	-	(1) 99
OR	Lukir	Albert Lea Seed	-	-	-	3.61	-	(1) 97
OR	Persist	Smith Seed	3.37	-	-	-	-	(1) 99
OR	Potomac	check	3.28	3.37	4.09	3.92	-	(4)100
OR	Treposno	Hood River Seed	-	-	4.09	-	-	(1) 98
OR	**SPECIES MEAN**		**3.41**	**3.37**	**4.16**	**3.74**	-	
PR	Albion (4n)	Cisco Seed	-	2.33	-	-	-	(1)100
PR	Dexter 1 (4n)	DLF Pickseed	-	-	2.89	-	2.93	(2) 96
PR	Garbor (4n)	DLF Pickseed	-	-	2.69	-	3.19	(2) 97
PR	Linn (2n)	check	2.22	2.31	2.72	2.89	2.80	(5) 93
PR	Mara (2n)	Barenbrug Seed	2.59	-	-	-	-	(1) 98
PR	Maximo (4n)	DLF Pickseed	2.54	-	3.48	-	-	(2)107
PR	Payday (4n)	Smith Seed	2.96	-	-	-	-	(1)112
PR	Tomaso	Albert Lea Seed	-	-	-	2.69	-	(1) 91
PR	Remington (4n)	Barenbrug Seed	2.88	-	-	3.33	3.50	(3)111
PR	**SPECIES MEAN**		**2.64**	**2.32**	**2.95**	**2.97**	**3.11**	
SB	Lincoln	Check variety	3.71	-	-	-	-	(1)104
SB	Hakari (Alaska brome)	Barenbrug Seed	3.33	-	-	-	-	(1) 93
SB	MBA	DLF Pickseed	3.70	-	-	-	-	(1)103
SB	**SPECIES MEAN**		**3.58**	-	-	-	-	
TF	BarElite	Barenbrug Seed	4.18	-	-	-	4.52	(2) 99
TF	Bariane	Barenbrug Seed	3.72	3.21	-	-	4.20	(3) 91
TF	Dominate	Allied Seed	4.50	-	-	-	-	(1)106
TF	Cajun II	Smith Seed	4.21	-	-	-	-	(1) 99
TF	Florine	Albert Lea Seed	-	-	-	4.75	-	(1)100
TF	FSG402TF	Allied Seed	4.33	-	-	-	-	(1)102
TF	Kentucky 31 plus	check	-	3.63	-	-	-	(1)105
TF	Kentucky 31 minus	check	4.24	3.58	4.11	5.06	4.86	(5)104
TF	Ranchero	Smith Seed	-	-	-	-	4.66	(1)102
TF	Swaj	Albert Lea Seed	-	-	-	4.45	-	(1) 94
TF	Tower	DLF Pickseed	4.61	-	4.01	-	-	(2)103
TF	**SPECIES MEAN**		**4.26**	**3.47**	**4.06**	**4.75**	**4.56**	
MdF	Cosmonaut	Barenbrug Seed	3.25	-	-	-	-	(1)100
MdF	Pradel	Barenbrug Seed	3.25	2.41	2.90	3.76	4.02	(3) 98
MdF	SW Minto	Albert Lea Seed	-	-	-	3.49	-	(1) 96
MdF	Raskila	Hood River Seed	-	-	3.14	-	-	(1)104
MdF	**SPECIES MEAN**		**3.25**	**2.41**	**3.02**	**3.63**	**-**	
TM	Climax	check	2.94	2.73	3.50	3.58	3.68	(4) 91
TM	Dawn	Allied Seed	-	-	4.00	-	-	(1)104
TM	Express II	Allied Seed	3.44	-	-	-	-	(1)108
TM	KY Early Timothy	Smith Seed	-	-	-	4.62	4.09	(2)109
TM	Winnetow	DLF Pickseed	-	-	-	-	3.89	(1)100
TM	Zenyatta	DLF Pickseed	-	-	3.99	-	-	(1)104
TM	**SPECIES MEAN**		**3.19**	**-**	**3.83**	**4.10**	**3.89**	

† FEST=Festulolium (ryegrass or fescue type), SB=Smooth Bromegrass, OR=Orchardgrass, PR=Perennial ryegrass, TF= Tall fescue, MdF= Meadow fescue, TM=Timothy

†† Number of trials with at least 2 years data and % of the mean (commercially available varieties)

‡ Seeding year and (the years the trial was harvested to obtain the average yield)

Table 8. Forage Yield (dry matter tons/acre) of Perennial Forage Grasses Seeded at Lake City in Northern Lower Michigan and at Chatham in the Upper Peninsula.

			Lake City ‡			Chatham ‡		
			Three-year average ‡‡‡		% species mean ‡‡	Three-year average ‡‡‡		% species mean ‡‡
Sp †	Variety	Marketer	2014 (2015-17)	2015 (2016-18)		2014 (2015-17)	2015 (2016-18)	
			----- dry matter tons/acre ------			------ dry matter tons/acre ------		
OR	Echelon	DLF Pickseed	3.20	-	(1)103	1.54	-	(1) 96
OR	Intensiv	Barenbrug Seed	3.27	4.09	(2)105	1.68	-	(1)105
OR	Persist	Smith Seed	2.97	3.84	(2) 97	1.58	-	(1) 99
OR	Potomac	check variety	3.02	3.82	(2) 97	1.59	1.69	(1)101
OR	**SPECIES MEAN**		**3.12**	**3.92**		**1.57**	**1.69**	
PR	Albion (4n)	Cisco Seeds	-	3.27	(1)107	-	0.72	(1) 88
PR	Linn (2n)	check variety	-	-	(1) 99	-	0.98	(1)120
PR	Mara (2n)	Barenbrug Seed	-	2.75	(1) 90	-	0.80	(1) 98
PR	Payday (4n)	Smith Seed	-	3.15	(1)103	-	-	-
PR	Remington (4n)	Barenbrug Seed	-	-	-	-	0.78	(1) 95
PR	**SPECIES MEAN**		**-**	**3.06**		**-**	**0.82**	
TF	Bariane	Barenbrug Seed	2.79	4.35	(2) 97	1.53	1.35	(2) 84
TF	Kentucky 31 Plus	check variety	3.08	4.19	(2)100	1.89	1.74	(2)106
TF	Kentucky 31 minus	check variety	2.98	4.29	(3)100	1.82	-	(1)101
TF	Kentucky 32	check variety	-	-	-	-	1.75	(1)109
TF	Tuscany II	Forage First	3.11	4.27	(2)102	1.98	-	(1)109
TF	**SPECIES MEAN**		**2.99**	**4.28**		**1.81**	**1.61**	
TM	BarPenta	Barenbrug Seed	3.12	-	(1) 95	1.94	-	(1) 92
TM	Climax	check variety	2.92	4.69		2.03	1.75	(2) 94
TM	Crest	Allied Seed	3.65	-	(1)111	2.19	-	(1)103
TM	Summit	Allied Seed	3.46	4.75	(2)102	2.33	-	(1)110
TM	Winnetow	DLF Pickseed	-	-	-	-	1.77	(1) 94
TM	Zenyatta	DLF Pickseed	-	5.01	(1)104	-	2.16	(1)114
TM	**SPECIES MEAN**		**3.29**	**4.82**		**2.12**	**1.89**	
MdF††	Pradel	Barenbrug Seed	-	3.70		-	1.75	-

† OR=Orchardgrass, PR=Perennial ryegrass, TF= Tall fescue, MdF= Meadow fescue, TM=Timothy

†† Only one commercially available variety of meadow fescue tested.

‡ Generally, three cuttings per year at Lake City. One or Two cuttings per year at Chatham.

‡‡ Number of trials and % of the mean (released varieties)

‡‡‡ Seeding year and (the years the trial was harvested to obtain the average yield)

Table 9. First cutting maturity Dates in 2020 of the varieties entered in the Perennial Grass Variety Trials at East Lansing in 2017 and 2018.

2017 Perennial Grass Trial

Tall Fescue	Date ††
Florine	May 26
Kentucky 31 Minus	May 26
Swaj	May 28

Meadow Fescue	Date
Pradel	May 28
SW Minto	May 28
FP 16058 †	May 29

Perennial Ryegrass	Date
Linn	May 24
Remington	Vegetative
Tomaso	Vegetative
RAD MFP-141 †	May 29
LP 16237 †	Vegetative
LP 16238 †	May 28

Festulolium	Date
Federo	May 28

Timothy	Date
Climax	Vegetative
KY Early	May 25

Orchardgrass	Date
Lucharm	May 27
Lukir	May 27
Potomac	May 25

2018 Perennial Grass Trial

Tall Fescue	Date ††
Bariane	May 29
Barelite	May 28
Bar FAF 17137 †	May 27
Bar FAF 17135 †	May 28
7FACF82 †	May 28
Kentucky 31 Minus	May 25
Ranchero	May 25

Meadow Fescue	Date
Pradel	May 27
Bar FPF 17079 †	May 28
Bar FPF 32 †	May 27

Perennial Ryegrass	Date
Dexter 1	May 29
Garbor	May 30
Linn	May 25
Remington	Vegetative
ROM 99 †	Vegetative
LP 17253 †	May 30

Festulolium	Date
Hostyn	May 28
Lofa	May 28
Perun	May 29

Timothy	Date
Climax	May 31
KY Early	May 24
Winnetow	Vegetative

† Experimental entry

†† Maturity Date - Date when 50% of all tillers have a fully emerged grass head that is clear of the flag leaf.

Table 10. Michigan State University Conventional Alfalfa Variety Trial Yields (DM tons/acre) East Lansing, Michigan. Seeded in May 2017.

	2020 DM Yields T/A, Four-cuts and Total							2017	
Variety	Cut 1 June 3	Cut 2 July 1	Cut 3 July 29	Cut 4 Oct 6	2020 Total	2019 Total	2018 Total	Seeding year	Trial Total
HybriForce 4400 ††	2.11	1.13	1.01	0.52	4.77*	5.76*	5.05*	1.56	17.14*
SW4107	1.86	1.11	1.05	0.45	4.47*	5.52*	4.75*	1.47	16.21*
msSunstra 164106 †	2.00	1.01	0.99	0.46	4.46*	5.34*	4.82*	1.48	16.10*
AFX 460 ††	1.78	1.08	1.01	0.34	4.22	5.37*	4.73*	1.38	15.70*
AFX 469	1.85	1.10	1.02	0.47	4.44*	5.35*	4.45*	1.40	15.64*
CalvaryDQ	1.73	0.97	0.92	0.44	4.06	5.16*	4.79*	1.49	15.50*
AFX 429	1.83	1.01	0.98	0.40	4.22	5.04*	4.41*	1.43	15.10
Fierce	1.67	0.96	0.93	0.41	3.97	5.05*	4.44*	1.56	15.02
Vernal	1.62	0.82	0.81	0.32	3.57	4.73	4.68*	1.55	14.53
CW 104014 †	1.75	0.96	0.82	0.38	3.91	4.70	3.89	1.23	13.73
Average	1.82	1.01	0.95	0.42	4.21	5.20	4.60	1.45	15.46
LSD 0.05	0.17	0.09	0.19	0.07	0.40	0.77	0.76	0.21	1.89
CV %	6.5	6.5	13.6	11.4	6.6	10.2	11.4	10.1	8.4

Table 11. Michigan State University Roundup Ready Alfalfa Variety Trial Yields (DM tons/acre) East Lansing, Michigan. Seeded in May 2017.

	2020 DM Yields T/A, Four-cuts and Total							2017	
Variety	Cut 1 June 3	Cut 2 July 1	Cut 3 July 29	Cut 4 Oct 6	2020 Total	2019 Total	2018 Total	Seeding year	Trial Total
Armour RR	1.78	1.01	1.00	0.39	4.18	5.25	4.90	1.11	15.44
DKA 44-16 RR	1.73	0.94	0.91	0.37	3.96	4.99	4.63	1.06	14.64
6424R	1.80	0.95	0.90	0.37	4.02	4.85	4.48	1.08	14.43
Average	1.77	0.97	0.94	0.38	4.05	5.03	4.67	1.08	14.83
LSD 0.05	0.18	0.14	0.23	0.05	0.42 ns	0.83 ns	0.87 ns	0.11	2.06 ns
CV %	5.8	8.6	13.9	6.9	6.0	9.6	10.8	6.0	8.0

† Experimental Variety †† Released variety seeded as an experimental.
* Yield is not statistically different from the greatest value in the column.
ns - Total yield among varieties in this column are not statistically different

Table 12. Michigan State University Alfalfa Variety Trial Yields (DM tons/acre), Conventional Alfalfa Varieties, East Lansing, Michigan. Seeded in July 2018.

	2020 DM Yields T/A, Four-cuts and Total						
Variety	Cut 1 June 3	Cut 2 July 1	Cut 3 July 29	Cut 4 Oct 6	2020 Total	2019 Total	Trial Total
msSunstra-164101 †	1.78	1.23	1.02	0.84	4.88*	5.86*	10.74*
AFX164048 †	1.86	1.19	1.07	0.84	4.96*	5.62*	10.58*
HybriForce 4400	1.82	1.22	1.05	0.74	4.83*	5.61*	10.44*
AFX164046 †	1.80	1.17	1.01	0.79	4.77*	5.42*	10.19*
HybriForce 4400-OBT2002	1.83	1.19	0.89	0.80	4.71*	5.45*	10.16*
TriFecta	1.65	1.09	0.90	0.73	4.37	5.64*	10.01*
HybriForce 4400-OBT2013	1.76	1.10	0.88	0.77	4.51*	5.40*	9.91*
SW4107	1.68	1.10	0.91	0.73	4.42	5.39*	9.81*
AFX164047 †	1.78	1.15	0.91	0.81	4.65*	5.10	9.75
CW A125023 †	1.56	1.09	0.84	0.73	4.23	5.39*	9.62
Emerald	1.59	1.07	0.80	0.66	4.13	5.10	9.23
AFX 460 ††	1.62	1.10	0.90	0.68	4.30	4.67	8.97
AFX155025 †	1.63	1.02	0.84	0.72	4.21	4.68	8.89
Vernal	1.66	0.99	0.89	0.76	4.30	4.47	8.77
AFX134014 †	1.54	0.98	0.86	0.58	3.96	4.59	8.55
Average	1.70	1.11	0.92	0.75	4.48	5.23	9.71
LSD 0.05	0.15	0.14	0.25	0.12	0.52	0.53	0.96
CV%	6.2	8.9	19.1	11.4	8.1	7.1	6.9

† Experimental Variety †† Released variety seeded as an experimental.

* Yield is not statistically different from the greatest value in the column.

ns - Total yield among varieties in this column are not statistically different.

Table 13. Michigan State University Alfalfa Variety Trial Seeding-Year Yields (DM tons/acre) East Lansing, Michigan. Seeded in July 2019

	2020 DM Yields T/A, Four-cuts and Total					2019	
Variety	Cut 1 June 6	Cut 2 July 1	Cut 3 July 29	Cut 4 Oct 6	2020 Total	Seeding year	Trial Total
msSunstra-184101 †	2.07	1.28	1.20	0.78	5.33*	1.22	6.55*
msSunstra-184104 †	2.07	1.28	1.14	0.78	5.28*	1.25	6.53*
OBT 154-FL2 †	2.03	1.24	1.22	0.76	5.24*	1.19	6.43*
SW3407	2.06	1.28	1.20	0.67	5.20*	1.11	6.31*
OBT 154-FL1 †	2.03	1.20	1.18	0.71	5.12*	1.15	6.27*
OBT 154-ANS †	1.96	1.22	1.10	0.75	5.03*	1.20	6.23*
msSunstra-184108 †	2.02	1.24	1.14	0.71	5.11*	1.07	6.18*
1041-2	2.01	1.18	1.10	0.77	5.05*	1.13	6.18*
OBT 3510-FL2 †	1.93	1.22	1.16	0.69	4.99*	1.17	6.16*
HybriForce 4400	2.14	1.11	1.07	0.75	5.06*	1.09	6.15*
OBT 3510-ANS †	1.99	1.23	1.10	0.68	5.00*	1.13	6.13*
OBT 3510-FL1 †	1.93	1.22	1.11	0.72	4.98*	1.13	6.11*
Finch	1.96	1.17	1.09	0.70	4.92*	1.14	6.06*
WL 349 HQ	1.92	1.24	1.12	0.68	4.97*	1.07	6.04*
SW4107	1.96	1.21	1.09	0.67	4.93*	1.07	6.00*
Vernal	1.94	1.09	1.06	0.64	4.74*	1.22	5.96*
SW5511	1.99	1.19	1.09	0.71	4.97*	0.95	5.92*
Triad	1.57	1.15	1.08	0.82	4.62	1.23	5.85*
Quail	1.90	1.13	1.07	0.69	4.78*	1.05	5.83
9401	1.83	1.14	1.03	0.67	4.67	1.03	5.70
Average	1.97	1.20	1.12	0.72	5.00	1.13	6.13
LSD 0.05	0.20	0.19	0.25	0.09	0.61	0.17	0.70
CV%	7.4	11.5	16.0	9.0	8.7	10.6	8.1

† Experimental Variety †† Released variety seeded as an experimental.

* Yield is not statistically different from the greatest value in the column.

ns - Total yield among varieties in this column are not statistically different.

Table 14. Michigan State University Conventional Alfalfa Variety Trial Yields (DM tons/acre) Upper Peninisula Research Station, Chatham, Michigan. Seeded July 2018.

	2020 DM Yields T/A, Three-cuts and Total					
Variety	Cut 1 June 24	Cut 2 July 29	Cut 3 Oct 6	2020 Total	2019 Total	Trial Total
HybriForce 4400	3.04	1.89	0.74	5.68*	2.86	8.54*
HybriForce 3400	3.10	1.88	0.75	5.73*	2.73	8.46*
Vernal	2.88	1.72	0.66	5.25	2.83	8.08*
Integra 8450	2.87	1.82	0.70	5.39*	2.68	8.07*
TriFecta	2.80	1.74	0.64	5.18	2.85	8.03*
Integra 8420	2.90	1.77	0.57	5.24	2.77	8.01*
SW4107	2.75	1.73	0.67	5.14	2.60	7.74
Average	2.92	1.81	0.68	5.41	2.77	8.13
LSD 0.05	0.25	0.12	0.17	0.39	0.28 ns	0.59
CV%	5.7	4.8	16.7	5.0	6.9	4.9

Table 15. Michigan State University Roundup Ready Alfalfa Variety Trial Yields (DM tons/acre) Upper Peninisula Research Station, Chatham, Michigan. Seeded July 2018.

	2020 DM Yields T/A, Three-cuts and Total					
Variety	Cut 1 June 24	Cut 2 July 29	Cut 3 Oct 6	2020 Total	2019 Total	Trial Total
6424R	2.62	1.70	0.51	4.83	2.36	7.19
DKA 40-51RR	2.66	1.68	0.53	4.88	2.22	7.10
DKA 44-16RR	2.55	1.65	0.53	4.73	2.36	7.08
Integra 8444R	2.50	1.68	0.51	4.69	2.26	6.96
Average	2.58	1.68	0.52	4.78	2.30	7.08
LSD 0.05	0.29	0.16	0.09	0.44 ns	0.25 ns	0.64 ns
CV%	7.0	6.0	11.0	5.8	6.90	5.6

* Yield is not statistically different from the greatest value in the column.

ns - Total yield among varieties in this column are not statistically different.

Table 16. Michigan State University Conventional Alfalfa Variety Trial Yields (DM tons/acre) Upper Peninisula Research Station, Chatham, Michigan. Seeded May 2019.

	2020 DM Yields T/A, Three-cuts and Total			
Variety	Cut 1 June 24	Cut 2 July 29	Cut 3 Oct 6	2020 Total
1041-2	2.23	1.70	0.77	4.70*
9401	2.14	1.73	0.65	4.52*
Swift	2.18	1.65	0.62	4.45*
Hybriforce 4400	2.10	1.65	0.62	4.37*
SW4107	2.12	1.59	0.61	4.32*
Vernal	2.09	1.58	0.53	4.21
SW3407	1.98	1.61	0.54	4.13
GO-018-FU (Falcata) †	2.37	1.04	0.58	3.98
SW5511	1.85	1.51	0.50	3.86
Triad	1.82	1.29	0.56	3.67
Average	2.09	1.54	0.60	4.22
LSD 0.05	0.26	0.19	0.13	0.46
CV%	8.4	8.6	14.70	7.5

† Experimental Variety

* Yield is not statistically different from the greatest value in the column.

ns - Total yield among varieties in this column are not statistically different.

Table 17. Michigan State University Red Clover 2020 Second-Year Variety Trial Yields (DM tons/acre) East Lansing, Michigan. Seeded in July 2018.

	2020 DM Yields T/A, Four-cuts and Total						
Variety	Cut 1 June 3	Cut 2 July 14	Cut 3 Aug 19	Cut 4 Nov 5	2020 Total	2019 Total	Trial Total
DFRC12 †	1.38	1.44	0.35	0.28	3.46	5.21*	8.67
DFRC15 †	1.38	1.40	0.33	0.26	3.37	5.28*	8.64
DFRC13 †	1.32	1.46	0.32	0.25	3.35	5.16*	8.51
DFRC14 †	1.38	1.42	0.32	0.29	3.41	4.96*	8.37
DFRC11 †	1.31	1.36	0.28	0.26	3.21	5.08*	8.29
Starfire II	1.31	1.38	0.34	0.25	3.29	4.56	7.84
Cinnamon Plus	1.36	1.29	0.33	0.29	3.27	4.44	7.71
Marathon	1.39	1.18	0.30	0.18	3.05	4.61*	7.66
Common ††	-	-	-	-	-	3.27	-
Average	1.35	1.37	0.32	0.26	3.3	4.73	8.21
LSD 0.05	0.23	0.13	0.14	0.15	0.50 ns	0.68	1.13 ns
CV%	6.2	11.6	28.1	38.4	10.2	9.9	9.4

† Experimental Variety

†† Common variety dead after cut 2 in 2019.

* Yield is not statistically different from the greatest value in the column.

ns - Total yield among varieties in this column are not statistically different.

Table 18. Michigan State University Perennial Grass Variety Trial Yields of Fescue (Tall and Meadow), Perennial Ryegrass and Festulolium, Orchardgrass and Timothy. Michigan State University Agronomy Farm, East Lansing, Michigan. Seeded May 2017.

Tall Fescue	Heading Date	2020 DM yields T/A, 3-cuts and Total Cut 1 May 30	Cut 2 July 13	Cut 3 Oct 9	2020 Total	2019 Total	2018 Total	Seeding Year Total	Trial Total
Kentucky 31 minus	5/26/2020	1.78	1.08	0.49	3.35*	5.61	6.22*	0.77	15.96
Florine	5/26/2020	1.48	0.92	0.57	2.97*	5.18	6.11*	0.61	14.86
Swaj	5/28/2020	1.37	1.03	0.49	2.88	5.14	5.32	0.86	14.20
LSD 0.05 (Tall Fescue)		0.15	0.23	0.13	0.40	0.66 ns	0.70	0.34 ns	1.15

Meadow Fescue	Heading Date	2020 DM yields T/A, 3-cuts and Total Cut 1 May 30	Cut 2 July 13	Cut 3 Oct 9	2020 Total	2019 Total	2018 Total	Seeding Year Total	Trial Total
FP 16058 †	5/29/2020	1.51	0.60	0.37	2.49*	4.67*	4.30	0.70	12.16
Pradel	5/28/2020	1.51	0.68	0.41	2.61*	4.18	4.49*	0.80	12.07
SW Minto	5/28/2020	1.60	0.43	0.28	2.31	3.95	4.21	0.76	11.23
LSD 0.05 (Meadow Fescue)		0.07	0.15	0.06	0.17	0.44	0.16	0.58 ns	0.84
Average (All Fescue)		1.55	0.79	0.43	2.76	4.79	5.11	0.75	13.36
LSD 0.05 (All Fescue)		0.10	0.19	0.09	0.28	0.47	0.42	0.40	0.87
CV %		4.5	15.7	13.4	6.8	6.5	5.4	35.3	4.3

Festulolium and Perennial ryegrass	Heading Date	2020 DM yields T/A, 3-cuts and Total Cut 1 May 30	Cut 2 July 13	Cut 3 Oct 9	2020 Total	2019 Total	2018 Total	Seeding Year Total	Trial Total
Federo (festulolium)	5/28/2020	1.47	0.73	0.18	2.37	4.75	4.31*	0.80*	12.23
Remington	Veg	0.85	0.58	0.22	1.65	4.14	4.21*	0.44*	10.45
RAD MFP-141 †	5/29/2020	1.17	0.42	0.20	1.79	4.09	3.93*	0.40*	10.19
LP 16237 †	Veg	0.70	0.56	0.23	1.49	3.78	3.84*	0.37	9.46
Linn	5/24/2020	1.43	0.25	0.18	1.85	3.28	3.53	0.24	8.91
LP 16238 †	5/28/2020	0.97	0.44	0.26	1.67	3.28	3.34	0.32	8.61
Tomaso	Veg	0.53	0.84	0.21	1.58	3.30	3.20	0.34	8.42
Average		1.02	0.55	0.21	1.77	3.80	3.77	0.42	9.75
LSD 0.05		0.16	0.17	0.08	0.21	0.27	0.51	0.16	0.71
CV%		10.4	20.9	26.6	7.8	4.7	9.1	25.5	4.9

Table 18. continued next page - Orchardgrass and Timothy

Table 18. continued - Orchardgrass and Timothy 2017 seeding year East Lansing.

Orchardgrass	Heading Date	2020 DM yields T/A, 3-cuts and Total				2019 Total	2018 Total	Seeding Year Total	Trial Total
		Cut 1 May 30	Cut 2 July 13	Cut 3 Oct 9	2020 Total				
Potomac	5/25/2020	1.62	0.84	0.44	2.89	4.45*	4.43*	0.53	12.30
Lucharm	5/27/2020	1.39	0.87	0.45	2.71	3.62	4.76*	0.70	11.79
Lukir	5/27/2020	1.40	0.84	0.44	2.68	3.98*	4.16	0.61	11.43
Average		1.47	0.85	0.44	2.76	4.02	4.45	0.61	11.84
LSD 0.05		0.28	0.29	0.16	0.68 ns	0.48	0.65	0.29 ns	1.28
CV%		11.0	20.1	21.3	14.1	6.9	8.4	27.2	6.1

Timothy	Heading Date	2020 DM yields T/A, 3-cuts and Total				2019 Total	2018 Total	Seeding Year Total	Trial Total
		Cut 1 May 30	Cut 2 July 13	Cut 3 Oct 9	2020 Total				
KY Early	5/25/2020	2.05	0.83	0.41	3.29	5.49*	5.07*	0.56	14.41
Climax	Veg	1.76	0.74	0.28	2.79	4.79	3.16	0.56	11.30
Average Timothy		1.91	0.79	0.35	3.04	5.14	4.12	0.56	12.86
LSD 0.05		0.34	0.58	0.20	1.11 ns	0.64	0.68	0.64 ns	1.82
CV%		8.0	32.7	25.7	16.1	5.6	7.3	50.7	6.3

† Experimental Variety

* Yield is not statistically different from the greatest value in the column.

ns - Total yield among varieties in this column are not statistically different.

Heading date Date when 50% of all tillers have a fully emerged grass head. An emerged head is completely clear of the flag leaf

Table 19. Michigan State University Perennial Grass Variety Trial Yields of Ryegrass (Perennial, Hybrid/Intermediate, Festulolium), Timothy, and Fescue (Tall and Meadow). Michigan State University Agronomy Farm, East Lansing, Michigan. Seeded in late July 2018.

Ryegrass (Perennial, Intermediate,Hybrid, and Festulolium)

		2020 DM yields T/A, Three-cuts and Total					2018	
Perennial	Heading Date	Cut 1 May 31	Cut 2 July 13	Cut 3 Oct 16	2020 Total	2019 Total	Seeding Year	Trial Total
ROM 99 †	Veg	0.81	0.64	0.12	1.57	5.40*	1.38*	8.36
Remington	Veg	0.87	0.72	0.14	1.73	5.26*	1.29	8.28
Garbor	5/30/2020	0.83	0.57	0.15	1.55	4.82	1.51*	7.88
Dexter 1	5/29/2020	0.92	0.39	0.15	1.46	4.39	1.31	7.16
LP 17253 †	5/30/2020	0.84	0.63	0.15	1.62	4.45	0.93	7.00
Linn	5/25/2020	1.64	0.30	0.12	2.06	3.54	0.59	6.18
Bison 2 (Hybrid/Inter) Dead after cut 2, 2019						3.92	0.80	-
LSD 0.05 (P ryegrass)		0.14	0.13	0.04	0.21	0.42	0.19	0.5

		2020 DM yields T/A, Three-cuts and Total					2018	
Festulolium (ryegrass type)	Heading Date	Cut 1 May 31	Cut 2 July 13	Cut 3 Oct 16	2020 Total	2019 Total	Seeding Year	Trial Total
Hostyn	5/28/2020	1.51	0.95	0.22	2.67	6.19	1.32*	10.18
Lofa	5/28/2020	1.39	0.94	0.13	2.46	6.31	0.82	9.58
Perun	5/29/2020	1.55	0.75	0.16	2.45	5.89	1.11*	9.46
LSD 0.05 (Festulolium)		0.22	0.07	0.06	0.28 ns	0.62 ns	0.25	0.89
Average (all ryegrass types)		1.15	0.65	0.15	1.95	5.14	1.14	8.23
LSD 0.05 (all ryegrass types)		0.16	0.16	0.04	0.29	0.46	0.18	0.63
CV %		9.8	17.0	21.1	10.2	6.1	10.9	5.2

		2020 DM yields T/A, Three-cuts and Total					
Timothy	Heading Date	Cut 1 May 31	Cut 2 July 13	Cut 3 Oct 16	2020 Total	2019 Total	Trial Total
KY Early	5/24/2020	2.16	0.94	0.21	3.31*	4.87	8.18*
Winnetow	Veg	1.78	0.68	0.10	2.57	5.20	7.77*
Climax	5/31/2020	1.6	0.70	0.08	2.38	4.97	7.34
Average		1.85	0.77	0.13	2.75	5.01	7.77
LSD 0.05		0.24	0.17	0.08	0.33	0.51 ns	0.71
CV%		7.5	12.6	35.1	6.9	5.8	5.3

Table 19. continued next page- Tall and Meadow fescue 2018 seeding year East Lansing

Table 19. continued - Tall and Meadow fescue 2018 seeding year East Lansing

Fescue (Tall and Meadow)							
		2020 DM yields T/A, Three-cuts and Total					
Tall Fescue	Heading Date	Cut 1 May 31	Cut 2 July 13	Cut 3 Oct 16	2020 Total	2019 Total	Trial Total
BAR FAF 17137 †	5/27/2020	1.72	1.16	0.55	3.43*	6.40*	9.83*
Kentucky 31 minus	5/25/2020	1.88	1.22	0.48	3.58*	6.13*	9.70*
Ranchero	5/25/2020	1.87	0.99	0.48	3.34*	5.98*	9.32*
Barelite	5/28/2020	1.55	1.04	0.44	3.03	6.01*	9.04*
BAR FAF 17135 †	5/28/2020	1.29	1.19	0.46	2.94	5.80*	8.75
Bariane	5/29/2020	1.41	1.10	0.47	2.98	5.41	8.39
7FACF82 †	5/28/2020	1.38	0.93	0.40	2.71	5.67	8.38
LSD 0.05 (Tall Fescue)		0.17	0.14	0.10	0.26	0.63	0.77
		2020 DM yields T/A, Three-cuts and Total					
Meadow Fescue	Heading Date	Cut 1 May 31	Cut 2 July 13	Cut 3 Oct 16	2020 Total	2019 Total	Trial Total
Pradel	5/27/2020	1.36	0.76	0.42	2.54	5.50	8.04
Bar FPF 17079 †	5/28/2020	1.55	0.87	0.33	2.75	5.27	8.02
Bar FPF 32 †	5/27/2020	1.47	0.75	0.33	2.55	5.20	7.75
LSD 0.05 (Meadow Fescue)		0.21	0.19	0.17	0.45 ns	0.60 ns	0.99 ns
Average (All Fescue)		1.55	1.00	0.44	2.98	5.74	8.72
LSD 0.05 (All Fescue)		0.18	0.15	0.12	0.34	0.58	0.76
CV%		8.2	10.5	19.3	7.8	7.0	6.0

† Experimental Variety
* Yield is not statistically different from the greatest value in the column.
ns - Total yield among varieties in this column are not statistically different.
Heading date Date when 50% of all tillers have a fully emerged grass head.
An emerged head is completely clear of the flag leaf

Table 20. Michigan State University Perennial ryegrass variety trial yields. Michigan State University Agronomy Farm, East Lansing, Michigan. Seeded in early August 2019.

		2020 DM yields T/A, Two-cuts and Total			2019	
	Heading	Cut 1	Cut 2	2020	Seeding	Trial
	Date	June 6	Aug 5	Total	Year	Total
DSV LP-A1901 †	5/30/2020	3.01	0.61	3.62*	0.93	4.54
Remington	6/2/2020	2.66	0.82	3.48*	0.98	4.45
DSV LP-A1902 †	5/28/2020	2.96	0.50	3.46*	0.91	4.37
PST LP-A1703 †	6/4/2020	2.39	0.75	3.14	1.05	4.19
Average		2.76	0.67	3.43	0.97	4.39
LSD 0.05		0.13	0.33	0.37	0.18	0.41 ns
CV%		2.9	30.6	6.8	9.1	5.9

Table 21. Michigan State University Italian and Annual ryegrass Variety Trial Yields. Michigan State University Agronomy Farm, East Lansing, Michigan. Seeded in early August 2019.

		2020 DM yields T/A, Three-cuts and Total				2019	
	Heading	Cut 1	Cut 2	Cut 3	2020	Seeding	Trial
Variety	Date	May 25	June 25	Aug 5	Total	Year	Total
DSV LM-A1904 †	5/25/2020	2.11	1.30	0.55	3.96	1.48	5.44
DSV LM-A1716 †	5/25/2020	1.97	1.41	0.50	3.88	1.40	5.28
Firkin	5/25/2020	1.96	1.26	0.54	3.76	1.49	5.24
DSV LM-A1903 †	5/25/2020	1.90	1.29	0.49	3.68	1.07	4.75
Fox	5/26/2020	1.87	1.09	0.56	3.51	1.16	4.67
PST LM-A1712 †	5/27/2020	1.91	1.04	0.38	3.33	1.13	4.46
Marshall	5/23/2020	1.57	1.04	0.37	2.98	1.22	4.20
Average		1.90	1.20	0.48	3.59	1.28	4.86
LSD 0.05		0.11	0.25	0.06	0.22	0.16	0.24
CV%		4.0	14.2	8.1	4.3	8.3	3.4

† Experimental Variety

* Yield is not statistically different from the greatest value in the column.

ns - Total yield among varieties in this column are not statistically different.

Heading date Date when 50% of all tillers have a fully emerged grass head. An emerged head is completely clear of the flag leaf

Table 22. Michigan State University Annual Grass Variety Trial Yields at East Lansing and Chatham. Seeded in June 2020.

Michigan State University Agronomy Farm, East Lansing

Teffgrass - two cuts and total

	2020 DM Tons/acre		
Variety	Cut 1 Aug 4	Cut 2 Oct 7	Seeding Total
Moxie	1.59	1.43	3.02
Tiffany	1.57	1.60	3.17
Average	1.58	1.52	3.10
LSD 0.05	0.21	0.04	0.20
CV%	8.9	1.8	4.4

Crabgrass - two cuts and to

	2020 DM Tons/acre		
Variety	Cut 1 Aug 4	Cut 2 Oct 7	2020 Total
Red river	1.82	1.37	3.20
Mojo	1.85	1.31	3.16
Average	1.84	1.34	3.18
LSD 0.05	0.10	0.10	0.17
CV%	3.7	5.0	3.7

Michigan State University UP Experiment Station, Chatham

Teffgrass - two cuts and total

	2020 DM Tons/acre		
Variety	Cut 1 Aug 6	Cut 2 Oct 6	2020 Total
Moxie	1.58	0.81	2.39
Tiffany	1.61	0.81	2.43
Average	1.60	0.81	2.41
LSD 0.05	ns	ns	ns
CV%	5.50	16.40	6.2

Crabgrass - One cut total

	2020 DM Tons/acre One cutting
Variety	Sept 1
Red River	2.01
Mojo	2.09
Average	2.05
LSD 0.05	ns
CV%	7.90

Italian Ryegrass Demonstration Plots - Chatham

Demonstration 1

	2020 DM Tons/acre		
Variety	Cut 1 Aug 6	Cut 2 Oct 6	2020 Total
Green Spirit	0.73	1.22	1.95
Firkin	0.79	1.36	2.15
Average	0.76	1.29	2.05
LSD 0.05	ns	ns	ns
CV%	7.9	10.1	9.8

Demonstration 2

	2020 DM Tons/acre		
Variety	Cut 1 Aug 6	Cut 2 Oct 6	2020 Total
Green Spirit	0.98	1.40	2.38
Feast II	1.04	1.69	2.73
Average	1.01	1.55	2.56
LSD 0.05	ns	ns	ns
CV%	1.0	10.4	6.7

Comments: 2 replications per demonstration. Italian ryegrass seeded at 30 lbs/acre

Table 23. Michigan State University 2019-20 Winter Triticale and Hybrid Rye Small Grain Forage Variety Trials. Michigan State University Agronomy Farm, East Lansing, Michigan. Seeded in September 2019.

Winter Triticale Forage Yield Trial

Variety	Heading date	Height inches	Yield DM T/A	DM %
TriCal Flex 719	5/26/2020	38.5	5.39	16.42
TriCal Thor	5/27/2020	37	5.33	15.31
TriCal Gainer 154	5/23/2020	37	5.13	16.23
TriCal Surge	5/25/2020	37	5.03	15.87
TriCal Exp 917 †	5/25/2020	32	4.79	16.61
Trical Exp 16401 †	5/26/2020	32	4.78	15.47
KWS Propower	5/20/2020	44	4.63	18.37
Average		36.8	5.01	16.33
LSD 0.05		4.7	0.50	1.59
CV%		8.6	6.7	6.6

Harvest date - May 27, 2020

Winter Rye and Hybrid Rye Forage Yield Trial

Variety	Heading date	Yield DM T/A	DM %
KWS Propower	5/20/2020	5.07	16.02
KWS Bono	5/19/2020	4.86	15.61
KWS Tayo	5/19/2020	4.65	16.48
KWS Serafino	5/18/2020	4.56	15.77
Brasetto	5/18/2020	4.53	16.19
KWS ProGas	5/18/2020	3.91	16.82
Average		4.60	16.15
LSD 0.05		0.61	0.98
CV%		8.8	4

Harvest date - May 23, 2020

† Experimental entry

Table 24. Michigan State University Berseem Clover Variety Trial Yields. Seeded in August 2019.

Variety	2019 Oct 19	% Stand May 2020	2020 DM tons/acre May 27	July 14	Total
Frosty	0.52	83.3	1.18	1.64	2.82
BigBee	0.56	33.3	0.44	1.01	1.45
CW 9092 EXP	0.80	1.7	-	-	-
VNS Berseem	0.60	0.7	-	-	-
Red Clover	0.67	100	1.94	1.40	3.33
Average	0.63	44	1.18	1.34	2.53
LSD 0.05	0.15	29	0.65	1.18 ns	1.63
CV%	12.60	35	24.30	38.6	28.50
Comments	The experimental and VNS Berseem varieties did not survive the winter Red Clover seeded as a perennial to compare winter survival				

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Michigan State University - Agronomy Farm, East Lansing, Michigan

Mike Particka - Farm Manager
John Calogero - Farm Assistant Manager
Brett Dan

Appendix II - East Lansing, Michigan

Rainfall data at the Michigan State University Agronomy farm by date, Summer 2020

Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches
April 1		May 1		June 1	0.08	July 1		August 1		Sept 1	0.58	Oct 1	
April 2		May 2		June 2		July 2		August 2	1.08	Sept 2		Oct 2	
April 3		May 3		June 3		July 3		August 3		Sept 3		Oct 3	
April 4		May 4		June 4		July 4		August 4		Sept 4		Oct 4	
April 5		May 5		June 5		July 5		August 5		Sept 5		Oct 5	
April 6		May 6		June 6		July 6		August 6		Sept 6	0.24	Oct 6	
April 7		May 7		June 7		July 7		August 7		Sept 7		Oct 7	
April 8	0.63	May 8		June 8		July 8	1.27	August 8		Sept 8	2.35	Oct 8	
April 9	0.22	May 9		June 9		July 9		August 9		Sept 9		Oct 9	
April 10		May 10		June 10		July 10	0.73	August 10		Sept 10		Oct 10	
April 11		May 11	0.22	June 11	0.97	July 11		August 11	0.21	Sept 11		Oct 11	
April 12		May 12		June 12	0.14	July 12		August 12		Sept 12		Oct 12	0.60
April 13		May 13		June 13		July 13		August 13		Sept 13	0.26	Oct 13	
April 14		May 14	0.92	June 14		July 14		August 14		Sept 14		Oct 14	
April 15		May 15	1.01	June 15		July 15		August 15		Sept 15		Oct 15	
April 16		May 16		June 16		July 16	0.61	August 16		Sept 16		Oct 16	
April 17		May 17	1.00	June 17		July 17		August 17		Sept 17		Oct 17	
April 18		May 18	1.07	June 18		July 18		August 18		Sept 18		Oct 18	0.20
April 19		May 19		June 19		July 19		August 19		Sept 19		Oct 19	0.10
April 20		May 20		June 20		July 20	0.29	August 20		Sept 20		Oct 20	
April 21		May 21		June 21		July 21		August 21		Sept 21		Oct 21	0.30
April 22	0.80	May 22		June 22	0.26	July 22		August 22		Sept 22		Oct 22	
April 23		May 23		June 23		July 23		August 23		Sept 23		Oct 23	1.44
April 24		May 24	0.07	June 24		July 24		August 24		Sept 24		Oct 24	
April 25		May 25	0.05	June 25		July 25		August 25		Sept 25		Oct 25	
April 26		May 26		June 26	1.01	July 26		August 26	0.25	Sept 26		Oct 26	
April 27		May 27		June 27		July 27		August 27		Sept 27		Oct 27	0.13
April 28	0.06	May 28		June 28		July 28		August 28	1.15	Sept 28	0.21	Oct 28	
April 29	0.56	May 29	0.65	June 29		July 29		August 29		Sept 29		Oct 29	
April 30	0.51	May 30		June 30		July 30		August 30		Sept 30	0.45	Oct 30	
		May 31				July 31		August 31				Oct 31	
2020 Totals	2.78		4.99		2.46		2.90		2.69		4.09		2.77
Normal	3.03		3.36		3.45		2.84		3.23		3.50		2.53

Appendix III - Chatham, Michigan

Rainfall data at the Michigan State University Agronomy farm by date, Summer 2020

Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches	Date	Inches
April 1		May 1		June 1	0.06	July 1		August 1		Sept 1	0.40	Oct 1	0.50
April 2		May 2	0.17	June 2	0.17	July 2		August 2		Sept 2		Oct 2	0.16
April 3		May 3		June 3	0.10	July 3		August 3	0.05	Sept 3	0.06	Oct 3	0.11
April 4	0.12	May 4		June 4		July 4		August 4		Sept 4	0.14	Oct 4	0.03
April 5		May 5		June 5		July 5		August 5		Sept 5		Oct 5	
April 6		May 6		June 6	0.25	July 6		August 6		Sept 6		Oct 6	
April 7	T	May 7		June 7		July 7	2.56	August 7		Sept 7		Oct 7	0.11
April 8	0.03	May 8	0.13	June 8		July 8		August 8		Sept 8		Oct 8	0.03
April 9		May 9	0.03	June 9		July 9	0.07	August 9	0.47	Sept 9		Oct 9	
April 10	0.03	May 10		June 10	0.89	July 10	0.78	August 10	0.22	Sept 10	0.40	Oct 10	
April 11		May 11	0.02	June 11	0.87	July 11	0.26	August 11	0.34	Sept 11		Oct 11	
April 12		May 12		June 12		July 12		August 12		Sept 12		Oct 12	
April 13	1.17	May 13		June 13		July 13		August 13		Sept 13	0.83	Oct 13	0.90
April 14	0.05	May 14	0.28	June 14		July 14		August 14		Sept 14		Oct 14	0.04
April 15		May 15	0.18	June 15		July 15	0.90	August 15		Sept 15		Oct 15	0.36
April 16		May 16		June 16		July 16		August 16		Sept 16		Oct 16	0.02
April 17		May 17		June 17		July 17		August 17		Sept 17		Oct 17	
April 18		May 18		June 18		July 18		August 18		Sept 18		Oct 18	0.48
April 19	T	May 19		June 19		July 19	1.33	August 19		Sept 19		Oct 19	
April 20		May 20		June 20	0.01	July 20	0.06	August 20	0.03	Sept 20		Oct 20	
April 21	0.09	May 21		June 21	0.87	July 21		August 21	0.05	Sept 21		Oct 21	0.43
April 22		May 22		June 22	0.11	July 22	0.89	August 22	0.01	Sept 22		Oct 22	
April 23		May 23		June 23	0.86	July 23	0.06	August 23		Sept 23		Oct 23	0.78
April 24		May 24		June 24	0.86	July 24		August 24		Sept 24	0.02	Oct 24	0.53
April 25		May 25		June 25		July 25		August 25		Sept 25	0.05	Oct 25	0.07
April 26		May 26	0.03	June 26		July 26	0.50	August 26	0.44	Sept 26	0.20	Oct 26	0.40
April 27		May 27		June 27	0.06	July 27	0.22	August 27	0.33	Sept 27	1.15	Oct 27	0.16
April 28	0.21	May 28	0.16	June 28		July 28		August 28		Sept 28		Oct 28	
April 29		May 29	0.51	June 29		July 29	0.02	August 29	1.84	Sept 29	0.13	Oct 29	0.17
April 30		May 30	0.03	June 30		July 30		August 30	0.03	Sept 30	0.15	Oct 30	0.01
		May 31	0.06			July 31		August 31	0.01			Oct 31	
2020 Totals	1.91		1.60		5.11		7.65		3.82		3.53		5.29
Normal	2.15		3.05		3.02		3.41		3.17		4.21		4.47

Marketers	Phone	Web Addresses
Albert Lea Seed	800-352-5247	www.alseed.com
Alforex Seeds	877-560-5181	www.alforexseeds.com
Allied Seed	866-325-6671	www.alliedseed.com
Amer. Grass Seed Prod.	800-247-7815	www.agsp.us
America's Alfalfa	800-873-2532	www.americasalfalfa.com
Ampac Seed Co.	866-530-7333	www.ampacseed.com
Barenbrug USA	800-547-4101	www.barusa.com
Blue River Organic Seeds	800-370-7979	www.blueriverorgseed.com
Brett Young Seeds	800-665-5015	www.brettyoung.ca
Byron Seed	618-599-8369	www.byronseeds.net
CHS Seeds	541-928-2393	www.chsseedresources.com
CISCO Seed	800-888-2986	www.ciscoseeds.com
Channel	314-694-2723	www.channel.com
Columbia Seed	541-757-1468	www.columbiaseeds.com
Crop Production Services	970-685-3300	www.cpsagu.com
Croplan Genetics	888-295-3011	www.croplangenetics.com
Cropmark Seeds (New Zeeland)	+64-3-347-7950	www.cropmarkseeds.com
Dahlco Seeds	888-324-5261	www.agreliantgenetics.com
Dairyland Seed Co.	800-236-0163	www.dairylandseed.com/
Dekalb	314-694-2723	www.asgrowanddekalb.com
DLF-International Seeds	800-445-2251	www.dlfis.com
Farm Science	888-252-7573	www.farmsciencegenetics.com
Hood River Seeds	855-406-2696	www.hoodriverseed.com
Lacrosse Forage and Turf	800-647-8873	www.lacrosseseed.com
Legacy Seed	866-791-6390	www.legacyseeds.com
Lewis Seed Co.	541-491-3700	www.lewisseed.com
LG Seeds	989-834-2251	ww.lgseeds.com
Monsanto	800-768-6387	www.monsanto.com
Mycogen Seeds	800-692-6432	www.mycogen.com
Nexgrow	855-463-9476	www.plantnexgrow.com
Nutech Seed	800-942-6748	www.nutechseed.com
Pioneer	800-247-6803	www.pioneer.com
Producers Choice	877-560-5181	www.producerschoiceseed.com
ProSeeds Marketing	541-928-9999	www.proseedsmarketing.com
Renk Seed	800-289-7365	www.renkseed.com
Seed Research of Oregon	800-253-5766	www.sroseed.com
Smith Seed Services	888-550-2930	www.smithseed.com
S&W Seeds	916-554-5480	www.swseedco.com
TriCal	843-817-2484	www.tricalforage.com
Wilbur-Ellis Seeds	989-323-7701	http://ag.wilburellis.com/
Winfield Solutions	989-845-2093	www.winfield.com
W-L Research	800-406-7662	www.wlresearch.com