

2018 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 create eye appeal to landscapes. Competition from row crops for land use continues to squeeze forage production acres while equipment, land, and labor costs increase. Under these market conditions, the importance of improving yield per acre through use of better forage varieties is an important component of profitability. Michigan hay prices were good in 2017, and a one-ton increase of average quality alfalfa hay yield was worth \$130 to 160/acre.

2018 Conditions.

Annual rainfall total and 30-year averages for April through October in East Lansing in southern Lower Michigan, Lake City in northern Lower Michigan, and Chatham in the Upper Peninsula are in **Table 1**. Temperatures in April were cooler than normal and switched to a warmer than usual May. Temperatures from May through September were warmer than usual. Areas in southern Lower Michigan received excessive rainfall in early May. Precipitation totals in June ranged from heavy in the Upper Peninsula and southern Lower Peninsula to very little in northern Lower Michigan. Both East Lansing and Lake City were relatively dry from early June to mid-July. Monthly precipitation totals at Chatham in the Upper Peninsula were above average from June through October. Harvests began on schedule at East Lansing and then were delayed by small frequent rains the last week of May and first week of June. A short heavy rain with wind in late May caused every alfalfa variety to lodge at both East Lansing and Lake City. First cutting at Chatham was also scheduled around the frequent rains during the month of June. Subsequent harvests the rest of the growing season were based on the plant maturity, plant growth, and scheduled around weather conditions.

2018 - Alfalfa and Red Clover

Alfalfa Variety Trials

Total test yields of alfalfa varieties planted at multiple locations in Michigan variety trials since 2009 are listed in **Tables 4 through 7**. Yields for individual cuttings and years are in **Tables 11 to 22** (pages 18 to 22) and may also be found at the MSU Forage Connection Website <http://www.forage.msu.edu>.

In 2018, alfalfa was cut four times at East Lansing and three times at Lake City and Chatham. Alfalfa trials cutting dates at East Lansing were June 6-12, July 7-9, August 11-13, and from October 19-22 as weather permitted. First cutting at Lake City was on June 20, about 2 weeks later than 2017, second cutting was on July 31 and third was on September 22. Cutting dates at Chatham were June 20, July 25, and October 2.

Yields at East Lansing were slightly higher in 2018 than those obtained in the dry summer of 2017. In the 2015 seeding, the conventional varieties averaged 5.19 and ranged from 4.30 to 5.69 tons/acre. The four RR varieties ranged from 4.30 to 5.45 tons/acre. Yields from the 24 conventional varieties in the 2016 seeding averaged 5.39 and ranged from 4.51 to 5.96 tons/acre. The six RR varieties averaged 4.68 and ranged from 4.46 to 4.98 tons/acre. In the 2017 conventional trial, yields averaged 4.60 and ranged from 3.88 to 5.05 tons per acre. Three RR alfalfa varieties in the 2017 seeding averaged 4.67 tons per acre.

First cutting of trials at Lake City was at least a week later than local producers in 2018. At Lake City, greatest average yield among trials was again from the 2015 seeding. The soil type of the 2016 seeding is sandier than the 2015 site and yields were about 30 percent lower. Average yield in the 2015 conventional trial was 4.89 and ranged from 4.36 to 5.28 tons/acre. Yields in the 2015 RR variety trial averaged 4.37 and ranged from 4.12 to 4.53 tons/acre. In the 2016 seeding, average total yield of the conventional varieties was 3.32 and ranged from 3.27 to 3.34 and the



RR variety average was 3.16, ranging from 3.06 to 3.26 tons/acre. First cutting at Chatham was scheduled between the frequent rains. Average yield of the varieties in the 2015 conventional seeding at Chatham was 4.07 and ranged from 3.83 to 4.39 tons/acre. Yields of the varieties in the 2015 RR seeding averaged 3.66 and ranged from 3.45 to 3.84 tons/acre. New trials of conventional and RR varieties were established at Chatham in 2018.

Red Clover Variety Trials

A new red clover variety trial was seeded in May 2017 at East Lansing. This was the first red clover trial to be established since 2010. The trial was cut two times in 2017, the seeding year. Yields were low due to the very dry summer. Four cuttings were taken in 2018. 2018 yields of red clover averaged 4.83 and ranged from 4.32 to 5.07 tons per acre. Total yields from the seeding year and per cut and total from 2018 are reported in **Table 31** (page 33). A new trial was seeded in late July 2018, but was not cut in the seeding year.

2018 Grass variety Trials

Perennial Cool-Season Grass Variety Trials

Cool-season grass species have been seeded in trials at the 3 locations since 2015. Perennial grass trials seeded at East Lansing were harvested 3 times in 2018. Cutting dates in East Lansing were on May 26 and 27, July 9-11, and third cut was in late September or October.

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Table 1. Actual and 30-year average precipitation (Inches) from April to October 2011 to 2018 at three variety test sites across Michigan.

	2011	2012	2013	2014	2015	2016	2017	2018	Avg
	East Lansing								
Apr	5.21	1.53	7.78	1.07	1.10	1.22	5.17	2.18	2.87
May	6.81	3.40	4.35	3.66	4.83	2.97	2.47	4.96	3.18
June	1.85	1.50	5.23	5.60	7.23	0.97	2.30	1.60	3.67
July	4.76	1.80	2.49	2.97	2.89	3.76	2.30	2.18	3.13
Aug	3.50	2.70	5.74	5.33	6.15	6.83	1.99	4.21	3.69
Sept	2.09	2.52	0.89	4.49	4.34	3.47	1.26	3.48	3.61
Oct	3.08	4.69	5.24	2.41	1.92	3.70	8.15	5.66	2.75
Total	27.30	18.14	31.72	25.53	28.46	22.92	23.64	24.27	22.90
	Lake City								
Apr	7.09	2.20	5.09	6.58	2.58	2.20	5.50	3.69	2.95
May	2.44	5.30	3.02	3.29	4.57	2.26	2.78	3.70	3.22
June	4.11	3.03	1.87	2.94	2.91	2.21	4.96	1.01	3.39
July	2.15	7.32	2.03	3.17	2.25	5.74	2.43	2.24	2.81
Aug	3.61	1.97	4.15	1.69	4.10	2.25	2.31	3.69	3.72
Sept	2.61	3.45	1.66	4.07	4.14	3.30	1.66	2.15	3.63
Oct	3.85	4.35	3.09	4.29	2.78	3.07	7.62	5.00	3.30
Total	25.86	27.62	20.91	26.03	23.33	21.03	27.26	21.48	23.02
	Chatham								
Apr	3.35	1.05	3.30	3.32	2.03	3.21	5.25	2.02	2.15
May	3.10	2.43	2.20	3.36	5.60	3.45	4.99	1.36	3.05
June	4.03	4.34	2.77	3.85	2.67	2.34	7.36	4.48	3.02
July	1.41	4.47	4.78	4.27	2.15	3.44	1.74	5.08	3.41
Aug	0.73	2.12	2.68	3.18	1.86	3.67	5.50	4.32	3.17
Sept	5.26	5.13	2.71	3.53	2.41	4.78	3.26	5.40	4.21
Oct	2.75	5.55	3.06	6.98	4.25	6.90	7.82	8.02	4.47
Total	20.63	25.09	21.50	28.49	20.97	27.79	35.92	30.68	23.48

There were only 2 instead of the usual 3 harvests at Lake City in 2018. There was very little growth after first cutting until late August and a second cutting was taken in late September. There were 2 cuttings at Chatham in 2018. These trials were harvested in June and again in early October.

Seven cool-season grass species or hybrid groups (orchardgrass, fescue, bromegrass, perennial ryegrass, timothy, Kentucky bluegrass and festulolium) are being evaluated for yield, maturity at first cutting, and persistence. A brief description of grass species with a summary of management recommendations is in **Table 2**. Long-term yields of grass varieties seeded in Michigan

trials are reported in **Tables 8 and 9**. Yields for individual cuttings and years are **Tables 23 to 29** (pages 23 to 32) and may also be found on the MSU Forage Connection Website at <http://www.forage.msu.edu>.

Highest yields at East Lansing were again obtained with the first cutting. Second cutting yields were low, but higher than in 2017. Third cutting yields in late September and early October were respectable after some timely rains after second cutting. Among cool-season grasses, tall fescue and orchardgrass were the most productive in the middle of summer.

In the 2015 trial seeding, yields of tall and meadow fescue ranged from 2.85 to 4.40,

orchardgrass from 3.81 to 3.99 tons per acre. Average yield, respectively, of two varieties each of timothy was 2.95, perennial ryegrass was 2.38, bromegrass was 3.07, and Kentucky bluegrass was 4.12 tons per acre in 2015 seeding. In the 2016 seeding, yields of fescue (tall, meadow, festulolium) averaged 4.22 and ranged from 2.64 to 4.87, orchardgrass average was 4.08 and ranged from 3.77 to 4.36, timothy average was 3.86 and ranged from 3.19 to 4.20, and the perennial ryegrass average was 2.73 and ranged from 2.46 to 3.07 tons per acre, respectively. In the 2017 seeding, yields of fescue (tall, and meadow) averaged 5.11 and ranged from 4.21 to 6.22, orchardgrass average was 4.45 and ranged from 4.15 to 4.76, the ryegrass (perennial and

festulolium) average was 3.77 and ranged from 3.20 to 4.31, the two timothy varieties yielded 3.16 and 5.07 tons per acre, respectively. A new perennial grass variety trial was planted in the last week of July in 2018. Varieties of ryegrass (perennial, intermediate/hybrid, festulolium), fescue (tall and meadow), and timothy were seeded as part of the trial. The ryegrass varieties were cut in late October. Average yield of the ryegrass varieties was 1.11 tons per acre. Weather and wet soil conditions did not allow a harvest of the new fescue trial. The timothy varieties did not produce enough growth in 2018 to harvest for yield.

At Lake City, perennial grass yields were obtained from 2 cuttings. In the 2015 seeding, total yield in tons per acre, respectively, of orchardgrass averaged 3.14 and ranged from 3.00 to 3.32, fescue (tall and meadow) averaged 2.80 and ranged from 2.27 to 3.12, timothy averaged 4.03 and ranged from 3.91 to 4.18, perennial ryegrass averaged 1.95 and ranged from 1.78 to 2.08. Two varieties of bromegrass yielded 2.73 and 2.84 tons/acre, respectively. In the 2017 trial, first-year yield of orchardgrass ranged from 3.46 to 4.04, fescue ranged from 3.37 to 4.94, perennial ryegrass ranged from 2.98 to 3.81, and two varieties of timothy yielded 4.05 and 4.12 tons/acre, respectively.

Grass variety trials at Chatham have many of the same grass varieties as in Lake City. Chatham is farther north where only 1 to 2 cuts per year may be feasible. Rainfall in May and early June was low at Chatham in 2018. First cutting is usually the most productive. Of the 6 species tested, however, only the timothy and bromegrass varieties yielded more in first cutting than in the much later second cutting. Perennial ryegrass and Kentucky bluegrass varieties yielded more in the second cut than in first cut. Total yield of orchardgrass was similar in both cuttings and fescue yielded slightly more in second cutting than in the first. In a trial seeded in 2015, total yield of orchardgrass averaged 1.38, fescue averaged 1.47, timothy averaged 2.46, bromegrass averaged 2.25, Kentucky bluegrass averaged 1.64 and perennial ryegrass averaged 0.95 tons per 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. Plant maturity ratings are reported in **Table 10** for East Lansing, Lake City and Chatham as the date when varieties reached 50% heading in the first cutting of the established trials. Some varieties never reached 50% heading before the harvest date and were rated as either vegetative, boot, or early heading. Grass maturity and the subsequent date of first cutting was about 1 week later this year than in 2017. In general, earliest to latest maturity within a species at East Lansing was about a week and shorter at

Lake City and Chatham. In previous years the span from earliest to latest has been as high as 10 days at East Lansing and about 7 days at the two northern locations. Using 'Potomac' orchardgrass check as a marker in 2018, grasses generally reached 50% heading about 2 weeks later in Lake City and three weeks later in Chatham than in East Lansing.

2017 Annual Grass Trial 2018 Data

Seven varieties of Italian ryegrass, one annual ryegrass (check), one black oat variety, and a regular oat variety (check) were evaluated in 2017. Persistence, first-cut heading dates, and yield (2 cuttings) were obtained in 2018 from the annual and Italian ryegrass varieties. Neither oat variety survived the winter. 2018 data are listed in **Table 30** (page 33).

ALFALFA VARIETY TEST

Michigan State University has evaluated more than 100 commercially available alfalfa varieties in its alfalfa variety trials since 2009. Plant breeders, developers, and marketers submit alfalfa varieties for evaluation. Varieties seeded in these trials are evaluated for yield and persistence for three full years after the seeding year. Testing locations in 2018 for the Michigan alfalfa variety trials were the Upper Peninsula Research and Extension Center at Chatham, the Lake City Research Center at Lake City, and the Michigan State University Agronomy Farm at East Lansing. Because glyphosate is used for weed control in Roundup-Ready trials, these are conducted as separate tests from conventional varieties. Vernal, a highly fall-dormant (FD 2) public variety released in 1953 has 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. 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.

Alfalfa Trait Ratings.

Ratings for plant traits are shown 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.

Fall Dormancy and Winterhardiness Ratings.

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. 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 winterhardness of alfalfa varieties. A lower WSI value indicates better winterhardness, 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**.

Alfalfa Disease and Pest Ratings.

An alfalfa variety consists of a population of plants which are genetically different from each other. 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 resistant. Moderate resistance, for example, 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 for good alfalfa production. A list of disease resistance ratings for varieties evaluated at MSU is provided in **Table 3**. Additional information and photos of alfalfa diseases can be found at www.alfalfa.org/pdf/AlfalfaAnalyst.pdf.

Bacterial Wilt (BW). BW is present in all of Michigan. All of the named varieties sold in Michigan are adequately resistant to BW.

Phytophthora Root Rot (PRR). This fungal disease, first found in Michigan in 1972, is now one of the state's most important alfalfa diseases. 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* 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 highest yielding varieties entered 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. 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 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.

How to Select an Alfalfa Variety for Michigan. Appropriate variety selection depends on location, desired stand life, cutting management, yield goal, and forage quality goal. Location matters because fewer cuttings are possible in shorter growing seasons. Intensive six-cut systems are possible in southernmost counties, but it is rarely practical to get more than three cuts in the Upper Peninsula. Regardless of location, there is always a tradeoff between number of cuttings and stand persistence. More cuttings per year means shorter harvest intervals that result in greater forage quality and greater cumulative yield for the first three to four years. The tradeoff is reduced stand life because of stress on roots. Varieties chosen for short-term, intensively managed stands in Michigan (three to four years) should be: dormant to moderately dormant (FD= 4-5), winterhardy (WSI rating 1 to 2), high yielding, and resistant to bacterial wilt (BW) and anthracnose (AN). Resistance to phytophthora root rot (PRR) is also recommended when alfalfa is grown on damp, fine-textured soils. For stand life longer than four years or for

Northern Michigan and UP regions, select dormant (FD = 2-4), winterhardy (WSI 1 to 2) varieties with high yields and resistance to BW, AN, PRR, and VW. Keep in mind that the reliability of variety rankings increases with the number of environments (i.e. the number of tests) in which the variety has been tested. Therefore, varieties that have been entered in only one or two tests may not perform as expected in a farm situation.

EVALUATION OF OTHER LEGUMES

Red clover (*Trifolium pratense*) varieties were seeded in 2017 and 2018 for evaluation in Michigan at East Lansing. Red clover is a good species for pasture renovation or works well as a short-term hay or haylage crop. Red clover usually produces greater yield in the seeding year than alfalfa, but generally only persists for two years. Improved varieties under proper management may persist beyond three years. These trials are being established and harvested for three years including the seeding year. Plot size is generally 3 ft wide by 20 to 25 ft long with 2 to 3 cuttings per year.

PERENNIAL COOL-SEASON GRASS TEST

A brief description of grass species with a summary of management recommendations is in **Table 2**. When selecting a grass variety, 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. The reliability of variety rankings increases with the number of environments (i.e. the number of tests) in which the variety has been tested. Therefore, varieties that have been entered in only one or two tests may not perform as expected in a farm situation.

Perennial cool-season grasses are evaluated for yield and persistence. Commercially available and experimental entries of orchardgrass, tall fescue, meadow fescue, timothy, perennial ryegrass, Kentucky bluegrass, and festulolium have been seeded in trials at the three locations. More than 50 varieties have been evaluated at East Lansing and more than 25 varieties have been planted at Lake City or Chatham. Nitrogen fertilizer is applied at green-up in early April and after each cutting.

Orchardgrass (*Dactylis glomerata* L.) is a high-yielding, competitive, perennial bunchgrass that grows more rapidly than most other Michigan forages in the early spring. Orchardgrass grows well on a wide range of soil types, but is not well suited for wet sites. Orchardgrass has similar nutritive characteristics to timothy and smooth brome and is often grown together with alfalfa. Because orchardgrass matures earlier than alfalfa, late-maturing varieties of

orchardgrass are preferred when the two are grown in mixture.

Bromegrasses (*Bromus spp.*) are rhizomatous, sod-forming grasses that are high in forage quality and yield. **Smooth brome** is one of the most winterhardy grasses in Michigan and can be grown on a wide range of soil types. Smooth brome has poor regrowth potential, producing most of its yield in the first cutting, and it should not be grazed or cut during stem elongation or early heading to prevent a reduction in tillering. **Meadow brome** has better regrowth potential and heat tolerance than smooth brome. Crosses between smooth and meadow brome, sometimes called **Intermediate Brome**, can have the best traits of both parents.

Timothy (*Phleum pratense* L.) is a bunchgrass that forms an open sod and persists well under poorly drained conditions. It is best known for its winterhardiness and ability to survive under ice sheeting. Timothy is a late-maturing grass that traditionally produces most of its yield in the first cutting and requires a long rest period after harvest, making it undesirable for harvest systems with more than two cuttings. Newer timothy varieties are bred for better regrowth potential.

Fescues (*Schedonorus spp.*) are sod-forming grasses with good seasonal growth distribution, and especially good fall growth. Tall fescue is persistent under frequent short grazing, heavy traffic, heat, drought, and poor drainage on a range of soil types, but has less cold tolerance for Northern Michigan than many other grasses. Tall fescue naturally contains an endophytic fungus that aids plant stress tolerance, but produces alkaloids toxic to livestock eating the forage. Many new varieties of **tall fescue** are endophyte-free or contain “friendly” novel endophytes that are not toxic to animals. Tall fescue varieties containing the toxic wild-type endophyte (E+) are not recommended for Michigan. **Meadow fescue** has better forage quality, palatability, and cold tolerance than tall fescue and does not contain toxic endophytes, but yields less.

Ryegrasses (*Lolium spp.*) are sod-forming bunchgrasses that are noted for extremely high forage quality and good regrowth potential. **Perennial ryegrass** is suitable for rotational grazing and multiple harvests for haylage, but it lacks the winterhardiness of many other grasses in Michigan, will go dormant under hot, dry conditions, and is difficult to dry as hay because of its waxy leaf cuticle. It requires high fertility and performs best under irrigation in Michigan. **Annual (Westerwold)** and **Italian ryegrasses** are short-lived species that

differ from each other primarily in vernalization requirement for flowering. Italian ryegrass requires a cold period to initiate heading and annual ryegrass does not. Italian and annual ryegrasses are generally similar to perennial ryegrass in adaptation and use characteristics, except that many varieties are not winterhardy in Michigan.

Festuloliums (*Schedonorus x Lolium spp.*) are crosses between a fescue (meadow or tall fescue) and a ryegrass (perennial or Italian ryegrass), thus combining the persistence and productivity of fescue with the palatability and nutritive quality of ryegrass. The large number of possible parent combinations results in a great range of appearance, yield and quality characteristics among festulolium varieties—some resemble fescue while others resemble ryegrass.

Kentucky bluegrass (*Poa pratensis* L.) is a relatively short-statured, sod-forming perennial grass that is very palatable when vegetative. It persists under frequent, close grazing and is very winter hardy in Michigan,

but is unpalatable when heading and quickly goes dormant under hot, dry summer conditions. Because of low yield potential, Kentucky bluegrass is more suitable for grazed than harvested forage systems.

ANNUAL GRASS TESTS

Annual grass trials are planted in plots 4 ft wide by at least 20 ft long. Harvest area is from the center 3 ft (6 rows) of each plot. Weed control is usually not needed in this trial, and it is fertilized with 50 lbs/acre N prior to first cutting and after first and second cutting. These trials are planted in the spring and typically harvested three times in the seeding year. Winter survival is evaluated the following spring and yield is obtained on surviving entries.

STATISTICS

For completed trials, yields are presented as the average annual yield for the three years after establishment. For trials not yet completed, averages are presented as the

average annual yield for the years available, excluding the establishment year. Check varieties are included in most tests to provide reference points for estimation of relative differences among tests conducted in different years or sites. The relative difference among varieties is expressed as a percentage of the check variety yield. Choice of varieties used as checks is based on familiarity to most producers across a wide area of the USA. Where check varieties are not available, relative differences are expressed as a percentage of the test average.

Comparison of yields among varieties should only be made within a trial. Under these conditions, statistical tests allow accurate separation of true genetic effects from random variation attributed to field or weather conditions. Space restrictions prevent publication of the entire test results here, but statistics including Least Significant Difference (LSD) and coefficient of variation (CV) for all forage variety trials are listed in the yearly yield data reports posted on the web at Michigan State University Forage Connection <http://www.forage.msu.edu>.

	Seeding rate (lb/acre) †	Seeds/lb (approx.)	Ease of establishment	Stand life (yr)	Acid	Wet	Drought	Cold	Heat	Pasture	Hay
Alfalfa	12-16	199,000	Easy	3-7	P††	P	E	E	E	VG	E
Red Clover	8-12	252,00	Easy	2-3	G	F	G	VG	F	F	G
Brome, meadow	15-20	93,000	Fair	5+	G	P	G	E	G	G	G
Brome, smooth	12-15	136,000	Slow	5+	G	P	E	E	G	F	G
Fescue, meadow	15-20	230,000	Easy	3-5	G	VG	E	G	G	E	E
Fescue, tall	10-15	230,000	Easy	5+	G	VG	VG	G	G	E	E
Festulolium	25-35	230,000	easy	3	F-G	G	*	*	*	E	G
KY bluegrass	5-15	2,200,000	easy	5+	G	G	P	E	P	E	P
Orchardgrass	10-15	653,000	easy	4-5	G	F	G	G	G	F	E
Reed canarygrass	6-8	534,000	slow	5+	G	E	VG	VG	G	G	G
Ryegrass, annual/Italian	20-30	227,000	easy	1-2	F	G	P	F	P	E	F
Ryegrass, perennial	20-30	230,000	easy	3-4	F	G	P	F	P	E	P
Timothy	6-12	1,234,000	easy	5+	G	F	P	E	P	P	E

†Use lower end of range for drilling and higher end for broadcasting. Reduce rates proportionately when planting in mixtures.
††Suitability Rating: P = poor, F = fair, G = good, VG = very good, E = excellent, * = variety-dependent.

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11	18	2018 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2015.
12	18	2018 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2015.
13	19	2018 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2016.
14	19	2018 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2016.
15	20	2018 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2017.
16	20	2018 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2017.
17	20	2018 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2015.
18	21	2018 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2015.
19	21	2018 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in Chatham, Michigan in August 2015.
20	22	2018 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Chatham, Michigan in August 2015.
21	22	2018 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2016.
22	22	2018 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2016.
23	23,24	2018 DM Yields of the MSU Orchardgrass, Fescue (Tall and Meadow), Perennial Ryegrass, Bromegrass, Kentucky Bluegrass, and Timothy Grass Variety Trials seeded in East Lansing, Michigan in May 2015.
24	24,25	2018 DM yields of the MSU Perennial Ryegrass, Timothy, Orchardgrass, and Fescue (Tall, Meadow, and Festulolium) Grass Variety Trials seeded in East Lansing, Michigan in August 2016.
25	26,27	2018 DM Yields of the MSU Fescue (Tall and Meadow), Perennial Ryegrass and Festulolium, Orchardgrass, and Timothy seeded in East Lansing, Michigan in May 2017.
26	27,28	2018 DM Yields of the MSU Orchardgrass, Perennial Ryegrass, Bromegrass, Timothy, and Fescue (Tall and Meadow) Grass Variety Trials seeded in Lake City, Michigan in July 2015.
27	29,30	2018 DM Yields of the MSU Timothy, Orchardgrass, Fescue, Timothy, Perennial Ryegrass, Kentucky Bluegrass, and Smooth Bromegrass Grass Variety Trials seeded in Chatham, Michigan in August 2015.
28	31	2018 DM Yields of the MSU Fescue (Tall and Meadow), Orchardgrass, Perennial Ryegrass, and Timothy Grass Variety Trial seeded in Lake City, Michigan in July 2017.
29	32	2018 Seeding-year DM Yields of the MSU Perennial Ryegrass Variety Trial seeded in East Lansing in July 2018.
30	33	2018 Second-Year DM Yields of the MSU Annual Grass Variety Trial seeded in East Lansing, Michigan in May 2017.
31	33	2018 Yield summary of the MSU Red Clover Variety Trial Seeded in East Lansing, Michigan in May 2017.

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
6415	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	NEXGROW
6417	4	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	H	-	-	NEXGROW
6431	4	2	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	-	NEXGROW
428RR	4	1	HR	HR	HR	HR	HR	HR	-	MR	RR	-	H	G	-	Allied Seed
4A415	2	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Mycogen
4A421	4	2.5	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Mycogen
4S417	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Mycogen
430 RR LH	4	2	HR	HR	HR	HR	HR	HR	-	MR	RR	HR	H	-	-	Farm Science
6200HT	2	2.5	HR	HR	HR	HR	HR	HR	-	MR	-	-	-	-	-	NEXGROW
6305Q	3	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	NEXGROW
6422Q	4	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	NEXGROW
6424R	4	2	HR	HR	HR	HR	HR	HR	HR	R	RR	-	H	-	-	NEXGROW
6475H	4	2	HR	HR	HR	HR	HR	HR	-	R	-	HR	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	-	-	-	-	Great Lakes Hybrids
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
AlfaFour Supreme	4	2	HR	HR	HR	HR	HR	HR	R	R	-	-	-	-	-	CHS Seed
AmeriStand 403T Plus	4	2	HR	HR	HR	HR	HR	HR	R	MR	-	-	-	-	-	America's Alfalfa
AmeriStand 407TQ	4	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	H	-	-	America's Alfalfa
AmeriStand 409LH	4	2	HR	HR	HR	HR	HR	HR	-	R	-	HR	-	-	-	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
Chesapeake	3	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	AgReliant
Contender	5	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Becks Hybrids
DG 3210	3	1	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Crop Production
DG 4210	4	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Crop Production
DKA33-16	3	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Dekalb
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
DKA43-13	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	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
Evergreen 3	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	NEXGROW
Everlast II	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Crop Production
FF42.A2	4	1.9	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Lacrosse
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 329	3	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	L	-	-	Farm Science
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
Gunner	5	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Croplan Genetics
Hi-Gest 360	3	1.5	HR	HR	HR	HR	HR	HR	HR	R	-	-	M	G	-	Alforex Seeds
HybriForce 2400	4	1.8	HR	HR	HR	HR	HR	HR	-	HR	-	-	-	F	-	Dairyland 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

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
HybriForce 4400	4	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Dairyland Seeds
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
KingFisher 243	5	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Byron Seeds
KingFisher 4020	4	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Byron Seeds
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 5.0	3	3	HR	HR	HR	HR	HR	R	-	MR	-	-	H	-	-	Croplan Genetics
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 459	4	2	HR	HR	HR	HR	HR	R	R	HR	-	-	-	-	-	Alforex Seeds
PGI 529	5	2	HR	HR	HR	HR	HR	-	-	R	-	-	M	-	-	Alforex Seeds
PGI 557	5	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	L	-	-	Alforex Seeds
Pioneer 53H92	3	-	HR	HR	HR	R	HR	HR	-	-	-	HR	-	-	-	Pioneer
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 55H94	5	-	HR	HR	HR	HR	HR	HR	-	HR	-	HR	-	-	-	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 55V48	5	-	HR	HR	HR	R	HR	HR	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
Prolific II	3	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Hyland Seeds
Radiance HD	4	2	HR	HR	HR	R	HR	HR	-	-	-	-	-	-	-	Ampac Seeds
Rebound 6.0	4	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	Croplan Genetics
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
Sonic	4	1	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Nutech Seed
StarGold	5	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Renk Seed
Stalwart II	5	1.5	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Great Lakes Hybrids
SW4107	4	-	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	S&W Seeds
TriFecta	5	2	HR	HR	HR	HR	HR	R	HR	HR	MR	-	-	-	-	TriCal
Velocity	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Nutech Seed
Vernal	2	2	R	S	S	S	MR	S	-	S	-	-	-	-	-	Public
WL 343 HQ	4	1.5	HR	HR	HR	HR	HR	HR	-	MR	-	-	H	-	-	W-L Research
WL 353 LH	4	2	HR	HR	HR	HR	HR	HR	-	R	-	HR	-	-	-	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 363 HQ	5	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	H	-	-	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 2009 to 2017											
Variety	Marketer	Three-year average ‡						2-year average 2016-2017	1-year total 2018	(Trials) † %	Vernal ††
		2009 (2010-12)	2010 (2011-13)	2011 (2012-14)	2012 (2013-15)	2013 (2014-16)	2014 (2015-17)				
----- dry matter tons/acre -----											
4S417	Mycogen Seeds	6.36	6.38	-	-	-	-	-	-	(2)123	
6417	NEXGROW	-	6.36	-	-	-	-	-	-	(1)115	
6422Q	NEXGROW	7.29	-	6.19	-	-	-	-	-	(2)130	
6585Q	NEXGROW	-	-	-	-	6.13	-	-	-	(1)117	
AFX 429	Alforex Seeds	-	-	-	-	-	-	-	4.41	-	
AFX 469	Alforex Seeds	-	-	-	-	-	-	-	4.45	-	
AlfaFour Supreme	CHS Seed	-	-	6.79	-	-	-	-	-	(1)120	
AmeriStand 403T Plus	America's Alfalfa	6.08	-	-	-	-	-	-	-	(1)125	
AmeriStand 407TQ	America's Alfalfa	6.98	-	6.28	-	-	-	-	-	(2)127	
Caliber	Becks Hybrids	-	-	-	-	-	5.81	4.33	-	(1)111	
CavalryDQ	Becks Hybrids	-	-	-	-	-	-	5.02	4.79	(1)128	
Chesapeake	AgReliant	6.79	-	-	-	-	-	-	-	(1)140	
Contender	Becks Hybrids	-	-	-	6.21	-	5.80	4.64	-	(3)112	
DG 4210	Crop Production	-	6.56	6.23	-	6.16	-	-	-	(3)115	
DKA43-13	Dekalb	-	6.31	-	-	-	-	-	-	(1)114	
Everlast II	Legacy Seeds	6.06	-	-	-	-	-	-	-	(1)125	
Enduro Elite	Cisco Seeds	-	-	-	-	-	5.73	-	-	(1)109	
FF42.A2	Lacrosse Seeds	-	-	-	-	-	-	5.05	-	(1)129	
Fierce	Becks Hybrids	-	-	-	-	-	5.86	4.94	4.44	(2)119	
ForageGold	Renk Seed	6.39	-	-	5.79	-	-	-	-	(2)116	
Fortune	DLF International	-	-	-	-	-	-	5.06	-	(1)121	
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	-	-	-	-	-	-	5.17	-	(1)124	
Gunner	Croplan Genetics	-	-	5.83	-	-	-	-	-	(1)103	
HybriForce 2400	Dairyland Seed	6.68	6.27	-	-	-	-	-	-	(2)125	
HybriForce 3400	Dairyland Seed	-	-	6.50	7.00	6.43	-	4.73	-	(4)120	
HybriForce 3400 QR	Dairyland Seed	-	-	-	6.63	-	-	-	-	(1)114	
HybriForce 3420 Wet	Dairyland Seed	-	-	-	-	-	-	5.29	-	(1)127	
HybriForce 3420/Wet-OB1	Osprey Biotechnics	-	-	-	-	-	-	5.23	-	(1)125	
HybriForce 3420/Wet-OB2	Osprey Biotechnics	-	-	-	-	-	-	5.71	-	(1)137	
HybriForce 3430	Dairyland Seed	-	-	-	-	-	-	5.30	-	(1)127	
HybriForce 4400	Dairyland Seed	-	-	-	-	-	-	4.94	5.25	5.05	(2)126
HybriPro BR	Hyland Seeds	-	-	-	-	-	5.68	-	-	(1)108	
Integra 8420	Wilbur-Ellis	-	-	-	-	-	-	5.35	-	(1)128	
Integra 8450	Wilbur-Ellis	-	-	-	-	-	-	5.44	-	(1)130	
KingFisher 243	Byron Seed	6.20	-	-	-	-	-	-	-	(1)128	
KingFisher 4020	Byron Seed	-	6.32	-	-	-	-	-	-	(1)114	
KF406A2	Byron Seed	-	-	-	-	-	-	5.18	-	(1)124	
KF425HD	Byron Seed	-	-	-	-	-	-	5.41	-	(1)129	
L455HD	Legacy Seeds	-	-	-	-	5.98	-	-	-	(1)114	
LegenDairy 5.0	Croplan Genetics	6.64	-	6.12	-	-	-	-	-	(2)122	
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	5.42	-	5.56	-	5.53	5.33	4.44	-	(5)105	
PGI 529	Alforex	-	-	-	-	6.66	-	-	-	(1)127	
PGI 557	Alforex	-	-	6.11	-	-	-	-	-	(1)108	
Pioneer 53H92	Pioneer	6.13	-	-	-	-	-	-	-	(1)126	
Pioneer 54Q14	Pioneer	-	-	-	-	-	5.54	-	-	(1)106	
Pioneer 54Q32	Pioneer	6.50	-	6.03	-	-	-	-	-	(2)120	
Pioneer 54QR04	Pioneer	-	-	-	-	5.95	-	-	-	(1)114	
Pioneer 55Q27	Pioneer	-	-	-	-	6.38	6.13	4.96	5.13	(4)122	
Pioneer 55V12	Pioneer	6.78	-	6.23	6.08	-	-	-	-	(3)118	
Pioneer 55V48	Pioneer	7.28	-	-	-	-	-	-	-	(1)150	
Pioneer 55V50	Pioneer	-	-	6.85	6.95	6.59	-	-	-	(3)122	
Prolific II	Hyland Seeds	-	-	6.54	-	-	5.64	-	-	(2)111	
Radiance HD	Legacy Seeds	6.91	-	-	-	-	-	-	-	(1)142	
Rebound 6.0	Croplan Genetics	-	-	6.01	-	-	-	-	-	(1)106	
Rebound 6XT	Croplan Genetics	-	-	-	-	-	-	4.85	-	(1)116	
SolarGold	Renk Seed	-	-	6.39	6.31	-	-	-	-	(2)111	
Sonic	Nutech Seed	-	-	6.21	-	-	-	-	-	(1)110	
Stalwart II	Great Lakes Hybrids	-	-	-	-	-	-	4.86	-	(1)116	
StarGold	Renk Seed	-	-	-	-	-	6.17	-	-	(1)118	
SW 4107	S & W Seed Company	-	-	-	-	-	-	-	4.75	-	
TriFecta	TriCal	-	-	-	-	-	-	5.27	-	(1)126	
Velocity	Nutech Seed	6.10	-	-	-	-	-	-	-	(1)126	
Vernal	public	4.85	5.53	5.67	5.80	5.23	5.25	3.93	4.18	4.68	(8)100
WL343HQ	W-L Research	-	5.81	-	-	-	-	-	-	(1)105	
WL354HQ	W-L Research	-	-	5.97	-	-	-	-	-	(1)105	
WL363HQ	W-L Research	6.84	6.26	-	-	-	-	-	-	(2)127	
WL365HQ	W-L Research	-	-	-	-	-	-	5.19	-	(1)124	
Mean		6.44	6.20	6.20	6.36	6.12	5.73	4.78	5.13	4.65	117

† 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. Long-term yield averages (dry matter tons/acre) from MSU Alfalfa Variety Trials seeded in Lake City, Michigan from 2009 to 2016.

Variety	Marketer	Three-year average ‡							2-year average	(Trials) †
		2009 (2010-12)	2010 (2011-13)	2011 (2012-14)	2012 (2013-15)	2013 (2014-16)	2014 (2015-17)	2015 (2016-18)	2016 (2017-18)	% Vernal ††
----- dry matter tons/acre -----										
6417	NEXGROW	-	4.90	-	-	-	-	-	-	(1)114
4A415	Mycogen Seeds	-	5.19	-	-	-	-	-	-	(1)120
4S417	Mycogen Seeds	3.84	5.18	-	-	-	-	-	-	(2)117
6305Q	NEXGROW	-	4.91	-	-	-	-	-	-	(1)114
6422Q	NEXGROW	3.99	-	-	-	-	-	-	-	(1)119
AmeriStand 403T Plus	America's Alfalfa	3.48	-	-	-	-	3.18	4.36	-	(3) 98
AmeriStand 407TQ	America's Alfalfa	3.81	-	4.65	-	-	-	-	-	(2)107
Chesapeake	AgReliant	3.81	-	-	-	-	-	-	-	(1)113
DG 3210	Crop Production	-	4.62	-	-	-	-	-	-	(1)107
DG 4210	Crop Production	-	4.87	4.63	-	2.58	3.35	4.53	-	(5)102
DKA43-13	Dekalb	3.73	-	-	-	-	-	-	-	(1)111
ForageGold	Renk Seed	-	-	-	3.89	-	-	-	-	(1) 95
FSG 329	Farm Science	4.09	-	-	-	-	-	-	-	(1)122
HybriForce 2400	Dairyland Seed	-	4.87	-	-	-	-	-	-	(1)113
HybriForce 3400	Dairyland Seed	-	-	-	4.31	-	3.65	4.91	-	(3)108
Hi-Gest 360	Alforex	-	-	-	-	-	3.40	-	-	(1) 97
Integra 8420	Wilbur-Ellis	-	-	-	-	-	-	-	3.41	(1) 97
Integra 8450	Wilbur-Ellis	-	-	-	-	-	-	-	3.37	(1) 96
L455HD	Legacy Seeds	-	-	-	-	2.77	3.83	4.48	-	(3)107
LegenDairy 5.0	Croplan Genetics	4.11	-	-	-	-	-	-	-	(1)122
Magnum 7 WET	Dairyland Seed	-	-	-	-	-	3.62	4.67	-	(2)105
Mariner IV	Allied Seed	-	-	-	-	-	3.81	4.76	-	(2)109
Oneida VR	public	-	-	-	-	2.61	3.62	4.63	-	(3)104
Octane	Brett Young	-	-	-	-	-	3.46	-	-	(1) 99
Pioneer 54Q32	Pioneer	3.99	-	4.59	3.99	-	-	-	-	(3)105
Pioneer 54Q14	Pioneer	-	-	-	-	-	3.20	4.45	-	(2) 97
Pioneer 54QR04	Pioneer	-	-	-	-	2.56	-	-	-	(1)100
Pioneer 55H94	Pioneer	-	-	4.39	-	-	-	-	-	(1) 95
Pioneer 55Q27	Pioneer	-	-	-	-	2.59	3.81	4.48	3.31	(4)102
Pioneer 55V12	Pioneer	3.52	-	4.36	3.98	-	-	-	-	(3) 99
Pioneer 55V48	Pioneer	3.52	-	-	-	-	-	-	-	(1)105
Pioneer 55V50	Pioneer	-	-	4.80	4.09	2.73	3.79	4.83	-	(5)106
Prolific II	Hyland Seed	-	-	-	-	-	3.81	4.72	-	(2)109
SolarGold	Renk Seed	-	-	-	3.90	-	-	-	-	(1) 96
Sonic	Nutech Seed	-	-	4.52	-	-	-	-	-	(1) 98
StarGold	Renk Seed	-	-	-	-	-	3.48	-	-	(1)100
Velocity	Nutech Seed	3.95	-	-	-	-	-	-	-	(1)118
Vernal	public	3.36	4.31	4.61	4.08	2.55	3.49	4.36	3.50	(8)100
WL 354HQ	W-L Research	-	-	-	-	-	3.11	-	-	(1) 89
Mean		3.78	4.86	4.57	4.03	2.63	3.54	4.60	3.40	104

† 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. Long-term yield averages (dry matter tons/acre) from MSU Alfalfa Variety Trials seeded in Chatham, Michigan between 2008 and 2015.

Variety	Marketer	Three-year average ‡					(Number) † % Vernal ††
		2008 (2009-11)	2009 (2010-12)	2012 (2013-15)	2013 (2014-16)	2015 (2016-18)	
----- dry matter tons/acre -----							
6417	NEXGROW	3.73	-	-	-	-	(1)107
6431	NEXGROW	3.64	-	-	-	-	(1)104
4A421	Mycogen Seeds	-	3.10	-	-	-	(1)107
Ameristand 403T Plus	America's Alfalfa	-	3.07	-	-	3.29	(2)101
Ameristand 407TQ	America's Alfalfa	3.45	2.96	-	-	-	(2) 97
DG 4210	Crop Production	-	-	-	3.74	3.28	(2)102
DKA 33-16	Dekalb	3.70	-	-	-	-	(1)106
DKA 43-13	Dekalb	-	3.23	-	-	-	(1)111
Evergreen 3	NEXGROW	3.23	-	-	-	-	(1) 92
ForageGold	Renk Seed	-	-	3.13	-	-	(1) 98
HybriForce 3400	Dairyland	-	-	-	-	3.45	(1)110
L455HD	Legacy	-	-	-	-	3.20	(1)102
Magnum 7 WET	Dairyland	-	-	-	-	3.13	(1)100
Mariner IV	Allied Seed	-	-	3.13	-	3.14	(2) 99
Oneida VR	Public	-	-	-	-	3.13	(1)100
Pioneer 53H92	Pioneer	-	2.88	-	-	-	(1) 99
Pioneer 54Q32	Pioneer	-	3.28	-	-	-	(1)113
Pioneer 55Q27	Pioneer	-	-	-	-	3.31	(1)105
Pioneer 55V12	Pioneer	-	3.25	3.31	-	-	(2)108
Pioneer 55V48	Pioneer	3.42	2.96	-	-	-	(2)100
Pioneer 55V50	Pioneer	-	-	3.56	3.66	-	(2)108
Prolific II	Hyland Seeds	-	-	-	-	3.28	(1)104
SolarGold	Renk Seed	-	-	3.61	-	-	(1)113
StarGold	Renk Seed	-	-	-	-	3.27	(1)104
Velocity	Nutech Seed	3.55	3.05	-	-	-	(2)103
Vernal	Public	3.50	2.90	3.19	3.53	3.14	(5)100
WL343HQ	W-L Research	3.55	-	-	-	-	(1)101
WL354HQ	W-L Research	-	-	-	-	3.08	(1) 98
Mean		3.53	3.07	3.32	3.64	3.23	103

† 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 7. Yields of Roundup Ready Alfalfa Varieties (dry matter tons/acre) seeded from 2013 to 2017 at East Lansing, Lake City, and Chatham, Michigan .

		East Lansing					Lake City					Chatham			
Variety	Marketer	3- year average ††			2-year avg	1-year total	3- year average ††			2-year avg	(Number)	3-year average ††		(Number)	
		2013 † (2014-16)	2014 †† (2015-17)	2015 † (2016-18)	2016 † (2017-18)	2017 (2018)	2013 † (2014-16)	2014 † (2015-17)	2015 † (2016-18)	2016 † (2017-18)	(Number) %	2013 † (2014-16)	2015 † (2016-18)	(Number) %	
		----- dm tons/acre -----													
428RR	Allied Seed	6.01	-	-	-	-	-	-	-	-	(1)102	-	-	-	
430RRLH	Allied Seed	-	-	4.16	-	-	-	-	-	-	(1) 89	-	-	-	
6424R	NEXGROW	-	-	-	-	4.48	-	-	-	-	-	-	-	-	
6497R	NEXGROW	5.94	-	-	-	-	-	-	-	-	(1)101	-	-	-	
9200RR	Great Lakes Hybrids	-	-	-	4.62	-	-	-	-	-	(1)101	-	-	-	
AmeriStand 455TQ RR	America's Alfalfa	5.81	-	-	-	-	-	-	-	-	(1) 99	-	-	-	
Armour	Becks Hybrids	-	-	-	-	4.90	-	-	-	-	-	-	-	-	
DKA40-51RR	Dekalb	-	5.10	4.80	4.38	-	-	-	3.16	(3) 96	-	2.83	(1) 94		
DKA41-18RR	Dekalb	5.72	-	-	-	-	-	-	-	(2)100	3.66	3.14	(2)102		
DKA43-22RR	Dekalb	-	5.20	-	-	-	-	-	-	(2)104	-	3.11	(1)103		
DKA44-16RR	Dekalb	5.99	5.24	4.52	4.67	4.63	(4)100	2.85	3.04	3.87	3.25	(4)101	3.59	3.09	(2)101
Integra 8444R	Wilbur-Ellis	-	-	-	4.35	-	(1) 95	-	-	-	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	-	-	-	4.77	-	(1)104	-	-	-	3.28	(1)103	-	-	-
RR AphaTron 2XT	Croplan Genetics	-	-	-	4.68	-	(1)102	-	-	-	-	-	-	-	-
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	2.75	-	-	-	(1) 98	3.64	-	(1)100
Mean		5.89	5.24	4.66	4.58	4.67		2.82	3.01	3.85	3.18		3.63	3.02	

† Seedlings cut 4 times per year at East Lansing, three times per year at Lake City and Chatham.

†† 2014 Seeding at East Lansing cut 3 times in 2015, 4 times in 2016, and 5 times in 2017.

‡ Number of trials with at least 2 years data and % of the mean at each location. †† Seeding year and (the years the trial was harvested to obtain the average yield)

Table 8. Long-term average yields (dry matter tons/acre) of perennial forage grasses seeded from 2007 to 2016 and 1-year total from 2017 at East Lansing, Michigan.

Sp †	Variety	Marketer	Three-year average ††						2-yr avg 2016 (2017-18)	1-yr total 2017 (2018)	% species mean ‡
			2007 (2008-10)	2009 (2010-12)	2011 (2013-14)	2013 (2014-16)	2014 (2015-17)	2015 (2016-18)			
----- dry matter tons/acre -----											
FEST	SpringGreen(organic)	Rose Agri-Seed Inc.	2.68	-	-	-	-	-	-	(1)107	
FEST	Gain	Allied Seed	2.34	-	-	-	-	-	-	(1) 93	
FEST	Becva (ryegrass type)	DLF Pickseed USA Inc	-	-	-	-	2.61	-	-	(1)106	
FEST	Barfest (ryegrass type)	Barenbrug Seed	-	-	-	-	2.33	-	-	(1) 94	
FEST	Federo (ryegrass type)	Albert Lea Seed	-	-	-	-	-	-	4.31	-	
FEST	SPECIES MEAN (ryegrass type)		2.51	-	-	-	2.47	-	4.31	-	
FEST	Fojtan (fescue type)	DLF Pickseed USA Inc	-	-	-	-	-	3.83	-	(1) 96	
FEST	Mahulena (fescue type)	DLF Pickseed USA Inc	-	-	-	-	-	4.11	-	(1)104	
FEST	SPECIES MEAN (TF Type)		-	-	-	-	-	3.97	-	-	
KB	Ginger	check	-	3.18	-	-	-	3.08	-	(1)112	
KB	Lato	Allied Seed	2.19	-	-	-	-	-	-	(1)108	
KB	Thorough Blue	ProSeeds Marketing	1.86	-	-	-	-	-	-	(1) 92	
KB	BigBlue	Rose Agri-Seed Inc.	-	2.48	-	-	-	-	-	(1) 88	
KB	SPECIES MEAN		2.03	2.83	-	-	-	3.08	-	-	
MB	AC Knowles	Agriculture Canada	2.83	-	-	-	-	-	-	(1) 81	
MB	Macbeth	CISCO Seed	-	3.24	-	-	-	-	-	(1)103	
MB	Montana	Seed Research of OR	4.19	3.07	-	-	-	-	-	(2)108	
MB	SPECIES MEAN		3.51	3.16	-	-	-	-	-	-	
OR	Barlegro	Barenbrug Seed	-	-	-	-	3.42	-	-	(1)100	
OR	Echelon	DLF Pickseed	-	-	3.79	-	3.43	-	4.53	(3)102	
OR	Elsie	Rose Agri-Seed Inc.	3.75	-	-	-	-	-	-	(1) 94	
OR	FSG506OG	Allied Seed	-	-	-	-	3.46	-	-	(1)101	
OR	Inavale	DLF Pickseed USA Inc	-	-	3.79	-	-	-	-	(1) 98	
OR	Intensiv	Barenbrug Seed	-	-	3.79	-	3.48	-	-	(2)100	
OR	Lyra	Hood River Seed	-	-	-	-	-	4.01	-	(1) 95	
OR	Lucharm	Albert Lea Seed	-	-	-	-	-	-	4.76	-	
OR	Lukir	Albert Lea Seed	-	-	-	-	-	-	4.16	-	
OR	Megabite	Rose Agri-Seed Inc.	4.09	-	-	-	-	-	-	(1)103	
OR	Persist	Smith Seed	-	3.58	4.12	-	3.37	-	-	(3)102	
OR	Potomac	check	4.15	3.49	3.83	-	3.28	3.37	4.19	4.43 (5)100	
OR	Treposno	Hood River Seed	-	-	-	-	-	-	4.12	(1) 98	
OR	Warrior II	ProSeeds Marketing	3.95	-	-	-	-	-	-	(1) 99	
OR	SPECIES MEAN		3.99	3.54	3.86	-	3.41	3.37	4.21	4.45	
PR	Albion (4n)	Cisco Seed	-	-	-	-	-	2.33	-	(1)100	
PR	BarSprinter (2n)	Barenbrug Seed	2.08	-	-	-	-	-	-	(1) 94	
PR	Bison 2 (4n)	DLF Pickseed USA Inc	-	-	-	-	-	3.56	-	(1)116	
PR	Calibra (4n)	check	-	1.92	-	-	-	-	-	(1)102	
PR	Dexter 1 (4n)	DLF Pickseed USA Inc	-	-	-	-	-	2.85	-	(1) 93	
PR	Elena (4n)	Allied Seed	-	-	-	2.25	-	-	-	(1)136	
PR	Fennema (2n)	DLF Pickseed USA Inc	-	-	2.21	-	-	-	-	(1) 87	
PR	Garbor (4n)	DLF Pickseed USA Inc	-	-	-	-	-	2.74	-	(1) 90	
PR	Kentaur (4n)	DLF Pickseed USA Inc	-	-	2.72	-	-	-	-	(1)108	
PR	Linn (2n)	check	-	1.84	2.39	1.07	2.22	2.31	2.68	3.53 (6) 88	
PR	Mathilda (4n)	DLF Pickseed USA Inc	-	-	2.50	-	-	-	-	(1) 99	
PR	Mara (2n)	Barenbrug Seed	-	-	-	-	2.59	-	-	(1) 98	
PR	Maximo (4n)	DLF Pickseed USA Inc	-	-	-	-	2.54	-	3.48	(2)105	
PR	Payday (4n)	Smith Seed	-	-	-	-	2.96	-	-	(1)112	
PR	Tomaso	Albert Lea Seed	-	-	-	-	-	-	3.20	-	
PR	Remington (4n)	Barenbrug Seed	2.78	-	2.81	-	2.88	-	-	4.21 (3)115	
PR	SPECIES MEAN		2.21	1.88	2.53	1.66	2.64	2.32	3.06	3.65	

Table 8 continued next page

Table 8 continued

Sp †	Variety	Marketer	Three-year average ‡						2-yr avg 2016 (2017-18)	1-yr total 2017 (2018)	% species mean †
			2007 (2008-10)	2009 (2010-12)	2011 (2013-14)	2013 (2014-16)	2014 (2015-17)	2015 (2016-18)			
----- dry matter tons/acre -----											
SB	Lincoln	Check variety	-	-	-	-	3.71	-	-	-	(1)104
SB	Hakari (Alaska Brome)	Barenbrug Seed	-	-	-	-	3.33	-	-	-	(1) 93
SB	MBA	DLF Pickseed USA Inc	-	-	-	-	3.70	-	-	-	(1)103
SB	SPECIES MEAN		-	-	-	-	3.58	-	-	-	
TF	BarElite	Barenbrug Seed	4.15	-	-	-	4.18	-	-	-	(2) 95
TF	Bariane	Barenbrug Seed	-	-	-	-	3.72	3.21	-	-	(2) 90
TF	Dominate	Allied Seed	-	-	-	-	4.50	-	-	-	(1)106
TF	Cajun II	Smith Seed	-	-	-	-	4.21	-	-	-	(1) 99
TF	Cowgirl	Rose Agri-Seed Inc.	4.84	-	-	-	-	-	-	-	(1)107
TF	Flourish	Allied Seed	-	-	-	3.38	-	-	-	-	(1) 88
TF	Florine	Albert Lea Seed	-	-	-	-	-	-	-	6.11	-
TF	FSG402TF	Allied Seed	-	-	-	-	4.33	-	-	-	(1)102
TF	Goliath	Cisco Seed	-	4.06	-	-	-	-	-	-	(1)101
TF	Hymark	Fraser Seeds	-	-	4.42	-	-	-	-	-	(1) 99
TF	Kentucky 31 plus	check	-	3.96	4.75	-	-	3.63	-	-	(3)103
TF	Kentucky 31 minus	check	-	-	-	3.45	4.24	3.58	4.22	6.22	(4) 99
TF	Noria	ProSeeds Marketing	4.75	-	-	-	-	-	-	-	(1)104
TF	Select	check	-	-	4.47	-	-	-	-	-	(1)100
TF	STF 43	Barenbrug Seed	-	-	4.26	-	-	-	-	-	(1) 95
TF	Swaj	Albert Lea Seed	-	-	-	-	-	-	-	5.32	-
TF	Tower	DLF Pickseed USA Inc	-	-	-	-	4.61	-	4.02	-	(2)103
TF	SPECIES MEAN		4.54	4.01	4.48	3.83	4.26	3.47	4.12	5.88	
MdF	Cosmonaut	Barenbrug Seed	-	-	-	-	3.25	-	-	-	(1) 98
MdF	Pradel	Barenbrug Seed	-	3.15	-	-	3.25	2.41	2.95	4.49	(3)101
MdF	Preval	Ampac	-	2.78	-	-	-	-	-	-	(1) 94
MdF	SW Minto	Albert Lea Seed	-	-	-	-	-	-	-	4.21	-
MdF	Raskila	Hood River Seed	-	-	-	-	-	-	3.09	-	(1)102
MdF	SPECIES MEAN		-	2.97	-	-	3.25	2.41	3.02	4.35	
TM	BarPenta	Barenbrug Seed	3.94	-	-	-	-	-	-	-	(1)101
TM	Climax	check	3.84	-	-	-	2.94	2.73	3.37	3.16	(3) 95
TM	Dawn	Allied Seed	-	-	-	-	-	-	3.73	-	(1)103
TM	Express II	Allied Seed	-	-	-	-	3.44	-	-	-	(1)108
TM	KY Early Timothy	Smith Seed	-	-	-	-	-	-	-	5.07	-
TM	Zenyatta	DLF Pickseed USA Inc	-	-	-	-	-	-	3.77	-	(1)104
TM	SPECIES MEAN		3.89	-	-	-	3.19	2.73	3.62	4.12	

† FEST=Festulolium (Ryegrass or Fescue type), KB=Kentucky bluegrass, MB=Meadow Bromegrass, 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 (released varieties).

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



Table 9. 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.

Sp †	Variety	Marketer	Lake City ‡				Chatham ‡			
			3-year average ‡‡‡			1 year Total 2017 (2018)	% species mean ‡‡	3-year average ‡‡‡		% species mean ‡‡
			2006 (2007-09)	2014 (2015-17)	2015 (2016-18)			2014 (2015-17)	2015 (2016-18)	
			----- dry matter tons/acre -----				dry matter tons/acre			
OR	Ambrosia	Amer. Grass Seed	3.36	-	-	-	(1) 99	-	-	-
OR	Bounty	Standish Milling	3.61	-	-	-	(1) 107	-	-	-
OR	Echelon	DLF Pickseed USA Inc	-	3.20	-	-	(1) 103	1.54	-	(1) 96
OR	Extend	Standish Milling	3.37	-	-	-	(1) 100	-	-	-
OR	Harvestar	Columbia Seeds	3.18	-	-	-	(1) 94	-	-	-
OR	Intensiv	Barenbrug Seed	-	3.27	4.09	-	(2) 105	1.68	-	(1) 105
OR	Lucharm	Albert Lea Seed	-	-	-	3.65	-	-	-	-
OR	Lukir	Albert Lea Seed	-	-	-	3.46	-	-	-	-
OR	Persist	Smith Seed	-	2.97	3.84	-	(2) 97	1.58	-	(1) 99
OR	Potomac	check variety	-	3.02	3.82	4.04	(2) 97	1.59	1.69	(1) 101
OR	SPECIES MEAN		3.38	3.12	3.92	3.72		1.57	1.69	
PR	Albion (4n)	Cisco Seeds	-	-	3.27	-	(1) 107	-	0.72	(1) 88
PR	Eurostar (2n)	Seed Research of OR	2.05	-	-	-	(1) 101	-	-	-
PR	Linn (2n)	check variety	-	-	-	2.98	-	-	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	Tomaso	Albert Lea Seed	-	-	-	3.46	-	-	-	-
PR	Verano (4n)	Columbia Seeds	2.01	-	-	-	(1) 99	-	-	-
PR	SPECIES MEAN		2.03	-	3.06	3.22		-	0.82	
TF	Bariane	Barenbrug Seed	-	2.79	4.35	-	(2) 97	1.53	1.35	(2) 84
TF	Enhance	Standish Milling	2.44	-	-	-	(1) 100	-	-	-
TF	Florine	Albert Lea Seed	-	-	-	4.85	-	-	-	-
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	4.94	(2) 100	1.82	-	(1) 101
TF	Kentucky 32	check variety	-	-	-	-	-	-	1.75	(1) 109
TF	Swaj	Albert Lea Seed	-	-	-	4.83	-	-	-	-
TF	Tuscany II	Forage First	-	3.11	4.27	-	(2) 102	1.98	-	(1) 109
TF	Verdant	Amer. Grass Seed	2.44	-	-	-	(1) 100	-	-	-
TF	SPECIES MEAN		2.44	2.99	4.28	4.87		1.81	1.61	
MdF	SW Minto	Albert Lea Seed	-	-	-	3.37	-	-	-	-
MdF	Pradel	Barenbrug Seed	-	-	3.70	4.09	-	-	1.75	-
MdF	SPECIES MEAN		-	-	-	3.73		-	1.75	
TM	BarPenta	Barenbrug Seed	-	3.12	-	-	(1) 95	1.94	-	(1) 92
TM	Climax	check variety	2.14	2.92	4.69	4.12	(3) 92	2.03	1.75	(2) 94
TM	Crest	Allied Seed	2.44	3.65	-	-	(2) 107	2.19	-	(1) 103
TM	KY Early Timothy	Smith Seed	-	-	-	4.05	-	-	-	-
TM	Summit	Allied Seed	2.55	3.46	4.75	-	(3) 104	2.33	-	(1) 110
TM	Winnetow	DLF Pickseed USA Inc	-	-	-	-	-	-	1.77	(1) 94
TM	Zenyatta	DLF Pickseed USA Inc	-	-	5.01	-	(1) 104	-	2.16	(1) 114
TM	SPECIES MEAN		2.38	3.29	4.82	4.09		2.12	1.89	
SB ††	Lincoln	check variety	-	-	4.03	-	-	-	1.38	-
FEST ††	Federo (ryegrass type)	Albert Lea Seed	-	-	-	3.81	-	-	-	-

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

†† Only one commercially available variety of Smooth Bromegrass and Festulolium (ryegrass type) tested.

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

‡‡ Number of trials with at least 2 years data and % of the mean (released varieties)

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

Table 10. Michigan State University Grass Maturity Dates in First Cutting of 2018 in the Perennial Grass Variety Trials at East Lansing, Lake City, and Chatham.

Trial - Seeding Year and Location						
Fescue						
(Tall, Meadow, Festulolium)						
Variety	2015			2016	2017	
	East Lansing	Lake City	Chatham	East Lansing	East Lansing	Lake City
BAR FA 13131 †	-	June 7	-	-	-	-
Bariane	Vegetative	June 11	Early Head	-	-	-
BAR FPF 32 (Meadow) †	-	June 4	-	-	-	-
FTF 70 †	-	-	-	May 26	-	-
FTF 73 †	-	-	-	May 27	-	-
FTF 96 †	-	-	-	May 26	-	-
FP 16058 (Meadow) †	-	-	-	-	May 27	-
Fojtan (Festulolium)	-	-	-	May 26	-	-
Florine	-	-	-	-	May 24	June 7
Kentucky 31 Minus	May 23	June 6	-	May 25	May 24	June 7
Kentucky 31 Plus	May 24	June 8	June 16	-	-	-
Kentucky 32	-	-	June 16	-	-	-
Mahulena (Festulolium)	-	-	-	May 22	-	-
Pradel (Meadow)	May 23	June 7	June 14	May 25	May 26	June 7
Raskila (Meadow)	-	-	-	May 26	-	-
Tower	-	-	-	May 27	-	-
Swaj	-	-	-	-	May 26	June 10
SW Minto (Meadow)	-	-	-	-	May 26	June 8
Tuscany II	-	June 8	-	-	-	-
Harvest Dates	May 26	June 20	June 19	May 27	May 27	June 20
Perennial Ryegrass						
(Intermediate, Festulolium)						
Variety	2015			2016	2017	
	East Lansing	Lake City	Chatham	East Lansing	East Lansing	Lake City
Albion	Vegetative	June 18	Vegetative	-	-	-
Bison 2 (Intermediate)	-	-	-	May 27	-	-
Dexter 1	-	-	-	May 27	-	-
Federo (Festulolium)	-	-	-	-	May 26	June 10
Garbor	-	-	-	May 27	-	-
Linn	May 21	-	June 18	May 21	May 21	June 3
LP16237 †	-	-	-	-	Vegetative	-
LP16238 †	-	-	-	-	May 26	-
Mara	-	June 16	Vegetative	-	-	-
Maximo (Intermediate)	-	-	-	May 24	-	-
Payday	-	June 15	-	-	-	-
RAD MFP-141 †	-	-	-	-	May 26	-
Remington	-	-	Late Boot	-	May 22	-
Tomaso	-	-	-	-	Vegetative	June 17
Harvest Dates	May 26	June 20	June 19	May 27	May 27	June 20
Timothy						
Variety	2015			2016	2017	
	East Lansing	Lake City	Chatham	East Lansing	East Lansing	Lake City
Climax	Vegetative	June 13	Early Head	Vegetative	Vegetative	June 16
Dawn	-	-	-	Boot	-	-
GO-120X †	Vegetative	June 13	June 18	-	-	-
KY Early	-	-	-	-	May 27	June 6
Summit	-	June 8	-	-	-	-
Winnetow	-	-	Early Head	-	-	-
Zenyatta	-	June 8	June 16	May 27	-	-
Harvest Dates	May 26	June 20	June 19	May 27	May 27	June 20

Table 10 continued next page

Table 10 continued

Trial - Seeding Year and Location						
Orchardgrass	2015			2016	2017	
	East Lansing	Lake City	Chatham	East Lansing	East Lansing	Lake City
Echelon	-	-	-	May 22	-	-
GO-BXCR †	My 20	June 2	June 8	-	-	-
GO-MOSO †	May 21	June 1	June 11	-	-	-
Intensiv	-	June 6	-	-	-	-
Lukir	-	-	-	-	Vegetative	Vegetative
Lucharm	-	-	-	-	Vegetative	Vegetative
Lyra	-	-	-	May 22	-	-
Persist	-	May 30	-	-	-	-
Potomac	May 18	May 30	June 8	May 17	May 18	May 31
OG 0707 †	May 19	-	-	-	-	-
Treposno	-	-	-	May 21	-	-
Harvest Dates	May 26	June 20	June 19	May 27	May 27	June 20

Bromegrass and Kentucky Bluegrass			
Variety	2015		
	East Lansing	Lake City	Chatham
Lincoln (Bromegrass)	May 24	June 12	Early Head
GO-SBF †	May 20	June 5	June 8
Ginger (Kentucky Bluegrass)	May 12	-	June 1
GO-13NF †	May 18	-	June 8
Harvest Dates	May 26	June 20	June 19

Veg - Varieties still in the vegetative stage on the date of first cutting
 Boot - Varieties in the boot stage on the date of first cutting
 Early Head - Varieties in the early heading stage on the date of first cutting



Variety	2018 Four-cuts and Total					2017 Total	2016 Total	3-year Total
	June 6	July 7	Aug 11	Oct 19	Total			
FSG415BR	2.41	1.71	0.75	0.84	5.69*	4.48*	5.83*	16.00*
msSunstra-144142 †	2.37	1.58	0.72	0.89	5.56*	4.42*	5.69*	15.67*
msSunstra-145154 †	2.39	1.64	0.73	0.76	5.52*	4.51*	5.40*	15.43*
msSunstra-144131 †	2.37	1.55	0.69	0.88	5.49*	4.29*	5.56*	15.34*
FF42.A2	2.21	1.73	0.77	0.64	5.37*	4.49*	5.28	15.14*
CavalryDQ ††	2.20	1.60	0.77	0.78	5.35*	4.44*	5.26	15.05*
Pioneer 55Q27	2.32	1.62	0.72	0.68	5.33*	4.36*	5.20	14.89*
HybriForce-4400 ††	2.29	1.49	0.68	0.80	5.25*	4.14*	5.43*	14.82*
Fierce	2.15	1.52	0.74	0.77	5.16	4.14*	5.45*	14.75*
msSunstra-145159 †	2.31	1.49	0.66	0.82	5.29*	3.96*	5.41*	14.66*
FSG426	2.18	1.61	0.69	0.68	5.14	4.15*	4.93	14.22
HybriForce-3400	2.38	1.35	0.60	0.80	5.14	3.88	5.16	14.18
Contender	2.18	1.45	0.65	0.70	4.98	3.87	5.06	13.91
CW 054004 †	2.09	1.54	0.72	0.71	5.06	3.99*	4.71	13.76
Caliber	2.07	1.35	0.64	0.72	4.78	3.69	4.51	12.98
Vernal	1.96	1.14	0.55	0.65	4.30	3.07	4.42	11.79
Average	2.23	1.52	0.70	0.75	5.19	4.12	5.20	14.51
LSD 0.05	0.14	0.24	0.11	0.09	0.47	0.55	0.53	1.44
CV %	5.7	14.0	13.2	10.4	8.0	11.7	8.9	8.7

† Experimental Variety †† Released variety seeded as an experimental.
 * Yield is not statistically different from the greatest value in the column.

Variety	2018 - Four-cuts and Total					2017 Total	2016 Total	3-year Total
	June 6	July 7	Aug 11	Oct 19	Total			
Pioneer 55VR06	2.33	1.69	0.73	0.70	5.45*	4.49*	5.55*	15.49*
DKA 40-51RR	2.13	1.58	0.69	0.66	5.05*	4.00*	5.35*	14.40*
DKA 44-16RR	2.08	1.42	0.61	0.64	4.75	3.78	5.04*	13.57
430RRLH	1.88	1.29	0.58	0.54	4.30	3.36	4.81	12.47
Average	2.11	1.50	0.65	0.64	4.89	3.91	5.19	13.98
LSD 0.05	0.13	0.28	0.10	0.07	0.49	0.56	0.65	1.61
CV %	5.3	14.9	12.3	9.1	8.2	11.7	10.1	9.3

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

Table 13. Michigan State University Conventional Alfalfa Variety Trial Yields (DM tons/acre) East Lansing, Michigan. Seeded May, 2016

Variety name	2018 - Four-cuts and Total					2017 Total	2016 Seeding Year	2016 Trial Total
	June 12	July 7	Aug 11	Oct 22	Total			
HybriForce-3420-OB2 ††	2.72	1.58	0.84	0.82	5.96*	5.45*	2.09*	13.50*
Integra 8450	2.68	1.41	0.78	0.72	5.60*	5.28*	2.12*	13.00*
HybriForce-3430 ††	2.72	1.20	0.70	0.87	5.49*	5.10*	2.19*	12.78*
msSunstra-143146 †	2.79	1.25	0.73	0.85	5.62*	4.98*	2.13*	12.73*
SW1412Y †	2.79	1.37	0.73	0.74	5.64*	5.18*	1.88	12.70*
HybriForce-4400 ††	2.78	1.27	0.69	0.83	5.56*	4.93*	2.15*	12.64*
Integra 8420	2.47	1.54	0.85	0.67	5.52*	5.18*	1.93	12.63*
KF425HD	2.72	1.43	0.80	0.62	5.57*	5.25*	1.79	12.61*
HybriForce-3420-OB1 ††	2.75	1.33	0.76	0.76	5.60*	5.05*	1.94	12.59*
HybriForce-3420 ††	2.64	1.29	0.73	0.75	5.41*	5.16*	1.98	12.55*
TriCal TriFecta ††	2.77	1.33	0.79	0.68	5.57*	4.97*	1.79	12.33*
KF406A2	2.74	1.22	0.73	0.72	5.41*	4.94*	1.97	12.32*
SW5213 †	2.70	1.29	0.79	0.66	5.45*	5.04*	1.72	12.21*
Pioneer 55Q27	2.68	1.22	0.69	0.72	5.31*	4.94*	1.93	12.18*
GA-497HD	2.54	1.35	0.76	0.64	5.30*	5.03*	1.77	12.10*
Fortune	2.74	1.22	0.67	0.68	5.31*	4.81*	1.86	11.98*
WL365HQ	2.52	1.52	0.75	0.59	5.39*	4.99*	1.58	11.96*
SW1314Y †	2.72	1.15	0.68	0.75	5.30*	4.69*	1.84	11.83*
Stalwart II	2.59	1.14	0.67	0.60	5.01	4.70*	1.86	11.57
Rebound 6XT	2.46	1.29	0.72	0.56	5.03	4.66	1.78	11.47
Oneida VR	2.46	0.97	0.50	0.80	4.72	4.16	1.84	10.72
Vernal	2.42	0.98	0.48	0.63	4.51	3.84	1.96	10.31
Average	2.67	1.29	0.72	0.71	5.39	4.95	1.92	12.25
LSD 0.05	0.17	0.43	0.21	0.13	0.76	0.97	0.17	1.73
CV %	4.5	23.4	21.2	13.0	10.0	13.9	6.3	10.0

† Experimental Variety †† Released variety seeded as an experimental.
 * Yield is not statistically different from the greatest value in the column.

Table 14. Michigan State University Roundup Ready Alfalfa Variety Trial Yields (DM tons/acre) East Lansing, Michigan. Seeded May 2016

Variety	2018 - Four-cuts and Total					2017 Total	2016 Seeding Year	2016 Trial Total
	June 12	July 7	Aug 11	Oct 22	Total			
Pioneer 55VR08	2.60	1.18	0.62	0.58	4.98*	4.55	1.63	11.16
RR AphaTron 2XT	2.40	1.27	0.62	0.50	4.79*	4.56	1.54	10.89
DKA44-16RR	2.21	1.27	0.62	0.54	4.64*	4.69	1.55	10.88
9200RR	2.38	1.21	0.60	0.50	4.69*	4.55	1.58	10.82
Integra 8444R	2.28	1.12	0.56	0.50	4.46	4.24	1.61	10.31
DKA40-51RR	2.39	1.13	0.51	0.50	4.51*	4.24	1.54	10.29
Average	2.38	1.20	0.59	0.52	4.68	4.47	1.58	10.73
LSD 0.05	0.14	0.24	0.09	0.08	0.47	0.51 ns	0.11 ns	1.00 ns
CV %	4.7	14.9	11.7	12.3	7.7	8.6	4.3	7.0

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

Variety	2018 - Four-cuts and Total					2017 Seeding	
	June 8	July 9	Aug 13	Oct 19	Total	year	Total
HybriForce-4400 ††	2.21	1.36	0.78	0.70	5.05*	1.56*	6.61*
msSunstra 164106 †	2.32	1.17	0.73	0.61	4.82*	1.48*	6.30*
Cavalry DQ	2.18	1.25	0.75	0.61	4.79*	1.49*	6.28*
Vernal	2.17	1.26	0.67	0.59	4.68*	1.56*	6.24*
SW4107	2.21	1.32	0.71	0.50	4.75*	1.47*	6.22*
CW A113005 †	2.07	1.48	0.75	0.42	4.73*	1.38*	6.11*
Fierce	2.11	1.19	0.69	0.46	4.44*	1.56*	6.00*
AFX 469	2.10	1.20	0.70	0.44	4.45*	1.40*	5.85*
AFX 429	2.07	1.23	0.68	0.44	4.41*	1.43*	5.84*
CW 104014 †	1.94	0.94	0.56	0.44	3.88	1.23	5.11
Average	2.14	1.24	0.70	0.52	4.60	1.46	6.05
LSD 0.05	0.24	0.39	0.15	0.09	0.76	0.21	0.88
CV %	7.6	21.7	15.0	11.5	11.4	10.1	10.1

† Experimental Variety †† Released variety seeded as an experimental.
 * Yield is not statistically different from the greatest value in the column.

Table 16. Michigan State University Roundup Ready Alfalfa Variety Trial Yields (DM tons/acre) East Lansing, Michigan. Seeded May 2017

Variety	2018 DM Yields T/A, Four-cuts and Total					2017 Seeding	
	June 8	July 9	Aug 13	Oct 19	Total	year	Total
Armour (RR)	2.16	1.38	0.81	0.56	4.90	1.11	6.01
DKA 44-16 RR	2.17	1.22	0.72	0.51	4.63	1.06	5.69
6424R	2.08	1.21	0.72	0.48	4.48	1.08	5.56
Average	2.14	1.27	0.75	0.52	4.67	1.08	5.75
LSD 0.05	0.22	0.41	0.16	0.12	0.87 ns	0.11 ns	0.91 ns
CV %	6.0	18.5	12.8	14.2	10.8	6.0	9.2

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

Table 17. Michigan State University Roundup Ready Alfalfa Variety Trial Yields (DM tons/acre) Lake City, Michigan. Seeded July 2015

Variety	2018 DM Yields T/A, Three-cuts and Total				2017	2016	3-year
	June 20	July 31	Sep 24	Total	Total	Total	Total
DKA 43-22RR	2.38	1.15	0.90	4.43	3.56	4.20	12.19
DKA 44-16RR	2.44	1.23	0.85	4.52	3.31	3.79	11.62
Pioneer 55VR06	2.46	1.18	0.89	4.53	3.23	3.86	11.62
DKA 41-18RR	2.38	1.03	0.83	4.25	3.36	3.92	11.53
DKA 40-51RR	2.27	1.00	0.85	4.12	2.87	3.77	10.76
Average	2.39	1.12	0.86	4.37	3.27	3.91	11.54
LSD 0.05	0.21	0.34	0.05	0.50 ns	0.80 ns	0.56 ns	1.78 ns
CV %	5.6	19.5	3.2	7.4	15.9	9.3	10.0

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

Table 18. Michigan State University Conventional Alfalfa Variety Trial Yields (DM tons/acre) Lake City, Michigan. Seeded July, 2015

Variety	2018 - Three-cuts and Total				2017 Total	2016 Total	3-year Total
	June 20	July 31	Sep 24	Total			
HybriForce-3400	2.91	1.32	1.05	5.28*	4.47	4.99*	14.74
Pioneer 55V50	2.84	1.38	0.98	5.20*	4.48	4.82*	14.50
Mariner IV	2.85	1.31	0.97	5.13*	4.52	4.62*	14.27
Prolific II	2.76	1.24	1.06	5.05*	4.45	4.67*	14.17
Magnum 7 Wet	2.88	1.35	1.03	5.26*	4.15	4.59	14.00
Oneida VR	2.54	1.10	0.91	4.55	4.49	4.85*	13.89
DG4210	2.49	1.30	0.88	4.68	4.46	4.46*	13.60
Pioneer 55Q27	2.56	1.38	0.93	4.86*	4.18	4.41	13.45
L455HD	2.57	1.32	0.90	4.80	4.30	4.35	13.45
Pioneer 54Q14	2.69	1.31	0.94	4.94*	4.13	4.29	13.36
Vernal	2.49	1.14	0.96	4.60	3.97	4.52*	13.09
Ameristand 403T Plus	2.45	0.97	0.94	4.36	4.20	4.50*	13.06
Average	2.67	1.26	0.96	4.89	4.32	4.59	13.80
LSD 0.05	0.21	0.21	0.09	0.43	0.81 ns	0.54	1.82 ns
CV %	5.4	11.8	6.7	6.2	13.0	8.2	7.8

* 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 19. Michigan State University Conventional Alfalfa Variety Trial Yields (DM tons/acre) Chatham, Michigan. Seeded August, 2015

Variety	2018 - Three-cuts and Total				2017 Total	2016 Total	3-year Total
	June 20	July 25	Sep 26	Total			
HybriForce-3400	1.85	1.82	0.72	4.39	2.68	3.29*	10.36
Pioneer 55Q27	1.67	1.83	0.65	4.15	2.61	3.18*	9.94
Ameristand 403T Plus	1.76	1.87	0.65	4.28	2.68	2.91	9.88
DG 4210	1.71	1.75	0.56	4.03	2.78	3.02*	9.83
Prolific II	1.84	1.81	0.62	4.27	2.47	3.09*	9.83
StarGold ++	1.65	1.86	0.57	4.10	2.65	3.06*	9.81
L455 HD	1.67	1.66	0.51	3.85	2.63	3.11*	9.59
Vernal	1.82	1.60	0.64	4.06	2.58	2.77	9.41
Magnum 7 Wet	1.74	1.54	0.54	3.83	2.59	2.97*	9.39
Oneida VR	1.80	1.57	0.58	3.96	2.57	2.85	9.38
Mariner IV	1.80	1.63	0.59	4.02	2.50	2.85	9.37
WL 354HQ	1.76	1.56	0.61	3.92	2.45	2.86	9.23
Average	1.76	1.71	0.60	4.07	2.60	3.00	9.67
LSD 0.05	0.24	0.36	0.16	0.59 ns	0.43 ns	0.36	1.16 ns
CV %	9.3	14.5	18.1	10.0	11.5	8.3	8.3

++ 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 20. Michigan State University Roundup Ready Alfalfa Variety Trial Yields (DM tons/acre) Chatham, Michigan. Seeded August, 2015

Variety	2018 - Three-cuts and Total				2017 Total	2016 Total	3-year Total
	June 20	July 25	Sep 26	Total			
DKA 41-18 RR	1.67	1.64	0.53	3.84	2.42	3.16	9.42
DKA 43-22 RR	1.71	1.57	0.56	3.83	2.39	3.12	9.34
DKA 44-16 RR	1.57	1.57	0.52	3.65	2.49	3.12	9.26
RR-501	1.47	1.50	0.52	3.50	2.21	3.09	8.80
DKA 40-51 RR	1.56	1.43	0.46	3.45	2.12	2.91	8.48
Average	1.60	1.54	0.52	3.66	2.33	3.08	9.06
LSD 0.05	0.21	0.31	0.24	0.72 ns	0.37 ns	0.32 ns	1.24 ns
CV %	8.5	13.2	30.0	12.8	10.3	6.8	8.9

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

Table 21. Michigan State University Conventional Alfalfa Variety Trial Yields (DM tons/acre) Lake City, Michigan. Seeded July, 2016

Variety	2018 - Three-cuts and Total				2017 Total	2-year Total
	June 20	July 31	Sep 22	Total		
Vernal	2.05	0.49	0.80	3.34	3.66	7.00
Integra 8420	1.91	0.60	0.86	3.36	3.45	6.81
Integra 8450	1.90	0.59	0.83	3.32	3.42	6.74
Pioneer 55Q27	1.90	0.51	0.85	3.27	3.34	6.61
Average	1.94	0.55	0.83	3.32	3.47	6.79
LSD 0.05	0.32	0.07	0.05	0.39 ns	0.34 ns	0.69 ns
CV %	10.3	8.5	4.6	7.2	6.2	6.3

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

Table 22. Michigan State University Roundup Ready Alfalfa Variety Trial Yields (DM tons/acre) Lake City, Michigan. Seeded July, 2016

Variety	2018 - Three-cuts and Total				2017 Total	2-year Total
	June 20	July 31	Sep 22	Total		
Pioneer 55VR08	1.86	0.62	0.77	3.26	3.30	6.56
DKA44-16RR	1.82	0.56	0.78	3.16	3.34	6.50
DKA40-51RR	1.85	0.53	0.78	3.16	3.15	6.31
Integra 8444R	1.68	0.61	0.76	3.06	3.00	6.06
Average	1.80	0.58	0.78	3.16	3.20	6.36
LSD 0.05	0.32	0.18	0.07	0.46 ns	0.34 ns	0.76 ns
CV %	11.0	19.9	5.6	9.0	6.7	7.5

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

Table 23. 2018 DM Yields (DM tons/acre) of the MSU Orchardgrass, Fescue (Tall and Meadow), Perennial Ryegrass, Timothy, Kentucky Bluegrass, and Smooth Bromegrass Variety Trials in East Lansing, Michigan in May 2015.

Orchardgrass	Heading Date	2018 yields, Three-cuts and Total				2017 Total	2016 Total	3-year Total
		May 26	July 11	Sep 29	Total			
OG 0707 †	5/19/2018	2.01	0.72	1.25	3.99	2.81	3.73	10.52
GO-MOSO †	5/21/2018	1.90	0.67	1.40	3.96	2.95	3.56	10.47
Potomac	5/18/2018	1.95	0.75	1.22	3.92	2.89	3.29	10.09
GO-BXCR †	5/20/2018	1.96	0.64	1.21	3.81	2.78	3.44	10.03
Average		1.96	0.70	1.27	3.92	2.86	3.50	10.28
LSD 0.05		0.12	0.14	0.37	0.44 ns	0.43 ns	0.66 ns	0.86 ns
CV %		3.9	13.3	18.1	7.1	9.4	11.7	5.2
Fescue								
(Tall and Meadow)	Heading Date	2018 yields, Three-cuts and Total				2017 Total	2016 Total	3-year Total
		May 26	July 11	Sep 29	Total			
Kentucky 31 Plus	5/24/2018	1.48	1.52	1.40	4.40*	3.04*	3.45*	10.90*
Kentucky 31 minus	5/23/2018	1.41	1.50	1.41	4.32*	2.99*	3.43*	10.75*
Bariane	Vegetative	1.14	1.41	1.22	3.77	2.53	3.32*	9.63*
Pradel	5/23/2018	1.31	0.72	0.82	2.85	2.01	2.38	7.24
Average		1.34	1.29	1.21	3.84	2.64	3.15	9.63
LSD 0.05		0.11	0.35	0.20	0.52	0.34	0.29	0.86
CV %		5.4	17.2	10.2	8.5	8.1	5.8	5.6
Perennial Ryegrass								
	Heading Date	2018 yields, Three-cuts and Total				2017 Total	2016 Total	3-year Total
		May 26	July 11	Sep 29	Total			
Albion	Vegetative	0.93	0.95	0.58	2.46	2.28	2.24	6.99
Linn	5/21/2018	1.51	0.50	0.28	2.29	2.24	2.41	6.94
Average		1.22	0.73	0.43	2.38	2.26	2.33	6.97
LSD 0.05		0.17	0.21	0.12	0.49 ns	0.65 ns	1.21 ns	2.30 ns
CV %		6.2	13.3	13.3	9.2	12.7	23.2	14.7
Timothy								
	Heading Date	2018 yields, Three-cuts and Total				2017 Total	2016 Total	3-year Total
		May 26	July 11	Sep 29	Total			
GO-120X †	Vegetative	2.02	0.49	0.69	3.20*	2.70	3.36*	9.27*
Climax	Vegetative	1.66	0.34	0.69	2.69	2.65	2.85	8.19
Average		1.84	0.42	0.69	2.95	2.68	3.11	8.73
LSD 0.05		0.10	0.39	0.10	0.50	0.19	0.33	0.60
CV %		2.7	41.6	6.3	7.6	3.1	4.8	3.1

Table 23. continued next page (Kentucky Bluegrass and Smooth Bromegrass)

Table 23. continued (Kentucky Bluegrass and Smooth Bromegrass)

Kentucky Bluegrass	Heading	2018 yields, Three-cuts and Total				2017	2016	3-year
	Date	May 26	July 11	Sep 29	Total	Total	Total	Total
Ginger	5/12/2018	2.48	0.83	0.76	4.07	2.01*	3.15	9.23
GO-13NF †	5/18/2018	2.19	0.86	1.11	4.16	1.46	2.89	8.51
Average		2.34	0.85	0.94	4.12	1.74	3.02	8.87
LSD 0.05		0.20	0.12	0.38	0.38 ns	0.49	0.50 ns	1.17 ns
CV %		3.8	6.5	18.0	4.1	12.6	7.4	5.9
Smooth Bromegrass								
Smooth Bromegrass	Heading	2018 yields, Three-cuts and Total				2017	2016	3-year
	Date	May 26	July 11	Sep 29	Total	Total	Total	Total
Lincoln	5/24/2018	2.09	0.49	0.60	3.17	1.97	3.05	8.18
GO-SBF †	5/20/2018	1.82	0.54	0.60	2.96	1.97	3.12	8.06
Average		1.96	0.52	0.60	3.07	1.97	3.09	8.12
LSD 0.05		0.07	0.29	0.07	0.38 ns	0.38 ns	0.37 ns	0.71 ns
CV %		1.7	25.4	5.4	5.5	8.6	5.0	3.9
† 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 24. 2018 DM Yields (DM tons/acre) of the MSU Timothy, Orchardgrass, Ryegrass (Perennial and Intermediate), and Fescue (Tall and Meadow) Variety Trials seeded in East Lansing, Michigan in July 2016.

Timothy	Heading	2018 yields, Three-cuts and Total				2017	Seeding	Trial
	Date	May 27	July 10	Sep 29	Total	Total	Year	Total
Zenyatta	5/27/2018	2.36	0.67	1.17	4.20*	3.33	0.83	8.36*
Dawn ††	Boot stage	2.13	0.86	1.19	4.18*	3.27	0.89	8.35*
Climax	Vegetative	1.74	0.50	0.96	3.19	3.54	0.69	7.43
Average		2.08	0.68	1.11	3.86	3.38	0.80	8.05
LSD 0.05		0.18	0.23	0.15	0.15	0.54 ns	0.27 ns	0.64
CV %		4.9	19.8	8.1	2.3	9.1	19.3	4.6
Orchardgrass								
Orchardgrass	Heading	2018 yields, Three-cuts and Total				2017	Seeding	Trial
	Date	May 27	July 10	Sep 29	Total	Total	Year	Total
Echelon	5/22/2018	1.81	0.84	1.71	4.36*	4.69*	0.94*	10.00*
Potomac	5/17/2018	2.01	0.76	1.38	4.14*	4.24	0.86*	9.24
Treposno	5/21/2018	1.93	0.82	1.30	4.05*	4.19	0.83*	9.07
Lyra	5/22/2018	1.81	0.68	1.28	3.77	4.24	0.66	8.68
Average		1.89	0.77	1.42	4.08	4.34	0.82	9.25
LSD 0.05		0.14	0.25	0.26	0.51	0.17	0.21	0.54
CV %		4.7	20.3	11.3	7.8	2.4	16.5	3.7

Table 24. continued next page (Ryegrass and Fescue)

Table 24. continued (Ryegrass and Fescue)

Ryegrass								
	Heading Date	2018 yields, Three-cuts and Total				2017 Total	Seeding Year	Trial Total
		May 27	July 10	Sep 29	Total			
Bison 2 (Hyb/Interm)	5/27/2018	1.58	0.88	0.61	3.07*	4.04*	1.39*	8.49*
Maximo (Intermediate)	5/24/2018	1.63	0.89	0.50	3.01*	3.95*	1.08	8.04
Dexter 1 (Perennial)	5/27/2018	1.27	0.78	0.56	2.60	3.09	0.85	6.54
Garbor (Perennial)	5/28/2018	1.19	0.71	0.59	2.49	2.99	0.75	6.22
Linn (Perennial)	5/21/2018	1.60	0.45	0.41	2.46	2.90	0.52	5.88
Average		1.45	0.74	0.53	2.73	3.39	0.92	7.04
LSD 0.05		0.11	0.23	0.13	0.29	0.28	0.16	0.43
CV %		4.7	20.4	15.2	6.8	5.3	11.2	4.0
Fescue								
Tall Fescue	Heading Date	2018 yields, Three-cuts and Total				2017 Total	Seeding Year	Trial Total
		May 27	July 10	Sep 29	Total			
FTF 96 †	5/27/2018	1.76	1.68	1.43	4.87	3.71	1.02*	9.60
Kentucky 31 minus	5/25/2018	1.82	1.66	1.22	4.70	3.74	1.02*	9.46
FTF70 †	5/26/2018	1.91	1.62	1.33	4.85	3.72	0.85*	9.42
FTF73 †	5/27/2018	1.84	1.50	1.35	4.69	3.78	0.86*	9.33
Tower	5/27/2018	1.60	1.55	1.24	4.39	3.65	0.72	8.75
LSD 0.05 Tall fescue		0.24	0.24	0.25	0.50	0.44 ns	0.23	0.88 ns
Festulolium (Tall Fescue type)								
Mahulena	5/22/2018	2.04	1.55	0.97	4.56	3.66	1.04	9.27
Fojtan	5/26/2018	1.92	1.42	1.15	4.49	3.17	0.92	8.58
LSD 0.05 Festulolium (TF type)		0.14	0.33	0.36	0.54	0.75 ns	0.24 ns	1.26 ns
Meadow Fescue								
Raskila	5/26/2018	1.33	0.63	0.68	2.64	3.54	1.20	7.39
Pradel	5/25/2018	1.38	0.64	0.73	2.75	3.15	0.87	6.77
LSD 0.05 Meadow Fescue		0.25	0.30	0.19	0.66 ns	0.52 ns	0.29 ns	1.34 ns
Average		1.73	1.36	1.12	4.22	3.57	0.94	8.73
LSD 0.05 (All Fescue)		0.18	0.21	0.21	0.41	0.37	0.20	0.78
CV %		7.1	10.5	12.7	6.6	7.2	14.6	6.1
† 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								
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 25. 2018 DM Yields (DM tons/acre) of the MSU Fescue (Tall and Meadow), Perennial ryegrass and Festulolium, Orchardgrass, and Timothy Grass variety trials Seeded in May 2017 in East Lansing, Michigan.

Fescue							
Tall Fescue	Heading	2018 Yields, Three-cuts and Total				Seeding	Trial
	Date	May 27	July 9	Oct 23	Total	Year	Total
Kentucky 31 minus	5/24/2018	2.84	1.55	1.84	6.22*	0.77	7.00*
Florine	5/24/2018	2.41	1.60	2.09	6.11*	0.61	6.71*
Swaj	5/26/2018	2.29	1.25	1.78	5.32	0.86	6.18
LSD 0.05 Tall Fescue		0.30	0.16	0.34	0.70	0.34 ns	0.65
Meadow Fescue							
Pradel	5/26/2018	2.16	1.05	1.28	4.49*	0.80	5.28
FP 16058 †	5/27/2018	1.99	0.80	1.50	4.30	0.70	5.00
SW Minto	5/26/2018	2.28	0.70	1.24	4.21	0.76	4.97
LSD 0.05 Meadow Fescue		0.15	0.14	0.15	0.16	0.58 ns	0.60 ns
Average		2.33	1.16	1.62	5.11	0.75	5.86
LSD 0.05 (All Fescue)		0.20	0.13	0.23	0.42	0.40	0.56
CV %		5.5	7.8	9.4	5.4	35.3	6.3
Perennial ryegrass							
	Heading	2018 Yields, Three-cuts and Total				Seeding	Trial
	Date	May 27	July 9	Oct 23	Total	Year	Total
Federo (festulolium)	5/26/2018	2.31	1.05	0.95	4.31*	0.80*	5.11*
Remington (ryegrass)	6/22/2018	2.01	1.19	1.01	4.21*	0.44*	4.65*
RAD MFP-141 (ryegrass) †	5/26/2018	2.35	0.93	0.65	3.93*	0.40*	4.33
LP 16237 (ryegrass) †	Vegetative	1.79	0.98	1.07	3.84*	0.37	4.20
Linn (ryegrass)	5/21/2018	2.33	0.75	0.45	3.53	0.24	3.77
LP 16238 (ryegrass) †	5/26/2018	1.88	0.92	0.54	3.34	0.32	3.67
Tomaso (ryegrass)	Vegetative	1.51	1.03	0.65	3.20	0.34	3.54
Average		1.20	0.98	0.76	3.77	0.42	4.18
LSD 0.05		0.19	0.40	0.12	0.51	0.16	0.63
CV %		6.3	27.9	10.5	9.1	25.5	10.1
Orchardgrass							
	Heading	2018 Yields, Three-cuts and Total				Seeding	Trial
	Date	May 27	July 9	Oct 23	Total	Year	Total
Lucharm	Vegetative	1.75	1.16	1.86	4.76*	0.70	5.46*
Potomac	5/18/2018	1.81	1.13	1.49	4.43*	0.53	4.96*
Lukir	Vegetative	1.55	0.98	1.63	4.16	0.61	4.77
Average		1.70	1.09	1.66	4.45	0.61	5.06
LSD 0.05		0.35	0.20	0.24	0.65	0.29 ns	0.59
CV %		12.0	11.0	8.3	8.4	27.2	6.8

Table 25. continued next page (Timothy)

Table 25. continued (Timothy)

Timothy	Heading Date	2018 Yields, Three-cuts and Total				Seeding Year	Trial Total
		May 27	July 9	Oct 23	Total		
KY Early Timothy	5/27/2018	2.27	1.35	1.45	5.07*	0.56	5.63*
Climax	Vegetative	1.77	0.47	0.92	3.16	0.56	3.72
Average		2.02	0.91	1.18	4.12	0.56	4.68
LSD 0.05		0.38	0.10	0.30	0.68	0.64 ns	0.33
CV %		8.4	4.9	11.3	7.3	50.7	3.2

† 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
 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 26. 2018 DM Yields (DM tons/acre) of MSU Orchardgrass, Perennial ryegrass, Timothy, Smooth Bromegrass, and Fescue (Tall and Meadow) Grass Variety Trials Seeded in July 2015 in Lake City, Michigan.

Orchardgrass	Heading Date	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 20	Sep 24	Total			
GO-BXCR †	6/2/2018	2.18	1.13	3.32	4.01	4.98*	12.31
Intensiv	6/6/2018	2.11	0.95	3.06	3.85	5.36*	12.27
Persist	5/30/2018	2.08	1.15	3.24	3.69	4.60	11.53
GO-MOSO †	6/1/2018	1.90	1.10	3.00	3.74	4.77*	11.51
Potomac	5/30/2018	2.10	0.98	3.07	3.85	4.53	11.47
Average		2.07	1.06	3.14	3.83	4.85	11.82
LSD 0.05		0.23	0.21	0.42 ns	0.33 ns	0.71	1.38 ns
CV %		7.2	13.1	8.6	5.5	9.6	7.6

Perennial Ryegrass	Heading Date	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 20	Sep 24	Total			
Albion	6/18/2018	1.34	0.74	2.08*	2.84*	4.88*	9.79*
PayDay	6/15/2018	1.32	0.67	1.99*	2.77*	4.69*	9.45*
Mara	6/16/2018	1.14	0.64	1.78	2.22	4.26	8.27
Average		1.27	0.68	1.95	2.61	4.61	9.17
LSD 0.05		0.32	0.19	0.45	0.28	0.61	0.94
CV %		14.8	16.2	13.4	6.2	7.6	6.0

Timothy	Heading Date	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 20	Sep 24	Total			
Zenyatta	6/8/2018	2.89	1.28	4.18	5.08	5.76	15.02*
Summit	6/8/2018	2.76	1.27	4.02	4.73	5.51	14.26*
Climax	6/13/2018	3.03	0.98	4.01	4.65	5.42	14.08*
GO-120X †	6/13/2018	2.83	1.08	3.91	4.55	5.37	13.82
Average		2.88	1.15	4.03	4.75	5.52	14.30
LSD 0.05		0.39	0.22	0.50 ns	0.64 ns	0.46 ns	1.16
CV %		8.5	12.0	7.7	8.5	5.2	5.1

Table 26. continued next page. (Smooth Bromegrass and Fescue)

Table 26. continued. (Smooth Bromegrass and Fescue)

Smooth Bromegrass	Heading Date	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 20	Sep 24	Total			
Lincoln	6/12/2018	2.07	0.76	2.84	3.73	5.52	12.08*
GO-SBF †	6/5/2018	2.02	0.72	2.73	3.58	5.38	11.69
Average		2.04	0.74	2.79	3.65	5.45	11.89
LSD 0.05		0.38	0.05	0.40 ns	0.33 ns	0.20 ns	0.33
CV %		8.3	1.2	6.4	4.1	1.7	1.2

Fescue							
Tall Fescue	Heading Date	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 20	Sep 24	Total			
Bariane	6/11/2018	1.93	1.03	2.96	4.40	5.68	13.04
BAR FA 13131 †	6/7/2018	2.05	1.08	3.12	4.28	5.53	12.93
Kentucky 31 minus	6/6/2018	2.01	0.92	2.92	4.44	5.52	12.90
Tuscany II	6/8/2018	2.05	0.98	3.03	4.43	5.34	12.81
Kentucky 31 Plus	6/7/2018	2.04	0.87	2.90	4.43	5.23	12.56
LSD 0.05 (Tall Fescue)		0.29	0.22	0.47 ns	0.37 ns	0.70 ns	1.37 ns
Meadow Fescue							
Pradel	6/7/2018	1.68	0.68	2.36	3.82	4.93	11.12
BAR FPF32 †	6/4/2018	1.65	0.62	2.27	3.67	4.92	10.86
LSD 0.05 (Meadow Fescue)		0.29	0.36	0.21 ns	0.77 ns	0.44 ns	1.05 ns
Average		1.91	0.88	2.80	4.21	5.31	12.32
LSD 0.05 (All Fescue)		0.25	0.21	0.39	0.42	0.67	1.29
CV %		8.9	16.2	9.4	6.7	8.5	7.1

† 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 27. 2018 DM Yields (DM tons/acre) of MSU Orchardgrass, Fescue (Tall and Meadow), Timothy, Perennial Ryegrass, Smooth Bromegrass, and Kentucky Bluegrass Grass Variety Trials Seeded in August 2015 in Chatham, Michigan.

Orchardgrass	Heading date/Notes	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 19	Oct 2	Total			
Potomac	6/8/2018	0.73	0.66	1.39	1.20	2.49*	5.07
GO-MOSO †	6/11/2018	0.69	0.76	1.45	1.13	2.26*	4.84
GO-BXCR †	6/8/2018	0.67	0.64	1.31	0.97	2.11	4.39
Average		0.69	0.69	1.38	1.10	2.28	4.77
LSD 0.05		0.20	0.27	0.44 ns	0.25 ns	0.29	0.89 ns
CV %		17.2	22.5	18.3	13.2	7.3	10.8
Fescue							
(Tall and Meadow)	Heading date/Notes	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 19	Oct 2	Total			
Pradel (Meadow)	6/14/2018	0.53	0.97	1.50*	1.16*	2.60*	5.26*
Kentucky 32	6/16/2018	0.70	0.87	1.57*	1.00*	2.68*	5.25*
Kentucky 31 plus	6/16/2018	0.69	0.93	1.62*	1.07*	2.52*	5.21*
Bariane	10% headed	0.47	0.74	1.21	0.86	1.99	4.06
Average		0.60	0.88	1.47	1.02	2.45	4.95
LSD 0.05		0.12	0.28	0.38	0.27	0.37	0.74
CV %		13.4	19.8	15.9	16.4	9.5	9.3
Timothy							
	Heading date/Notes	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 19	Oct 2	Total			
Zenyatta	6/15/2018	1.53	1.40	2.93*	1.89	1.67*	6.49*
GO-120x †	6/18/2018	1.56	1.23	2.79*	1.95	1.53*	6.28*
Winnetow	25% headed	1.40	0.81	2.21	2.09	1.02	5.33
Climax	25% headed	1.26	0.63	1.89	1.82	1.53*	5.24
Average		1.44	1.02	2.46	1.94	1.44	5.83
LSD 0.05		0.21	0.39	0.32	0.36 ns	0.43	0.88
CV %		9.3	23.7	8.2	11.6	18.8	9.4
Perennial Ryegrass							
	Heading date/Notes	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 19	Oct 2	Total			
Linn	6/18/2018	0.27	0.69	0.95	0.42*	1.56*	2.93*
Mara	Vegetative	0.25	0.71	0.96	0.17	1.27	2.40
Remington	Late Boot	0.30	0.57	0.87	0.33*	1.15	2.36
Albion	Vegetative	0.34	0.67	1.02	0.20	0.93	2.15
Average		0.29	0.66	0.95	0.28	1.23	2.46
LSD 0.05		0.14	0.16	0.19 ns	0.10	0.19	0.26
CV %		30.8	15.3	12.5	22.4	9.9	6.5

Table 27. continued next page. (Smooth Bromegrass and Kentucky Bluegrass)

Table 27. continued. (Smooth Bromegrass and Kentucky Bluegrass)

Smooth Bromegrass	Heading date/Notes	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 19	Oct 2	Total			
GO-SBF †	6/8/2018	1.27	1.07	2.35	0.45	1.95	4.74
Lincoln	10% headed	1.15	0.99	2.14	0.41	1.59	4.14
Average		1.21	1.03	2.25	0.43	1.77	4.44
LSD 0.05		0.43	0.66	1.00 ns	0.23 ns	0.52 ns	1.57 ns
CV %		15.7	28.4	19.8	23.8	13.2	15.7
Kentucky Bluegrass							
	Heading date/Notes	2018 Yields, Two-cuts and Total			2017 Total	2016 Total	3-Year Total
		June 19	Oct 2	Total			
GO-13 NF †	6/8/2018	0.57	1.13	1.71	0.50	1.08	3.29
Ginger	6/1/2018	0.68	0.88	1.57	0.37	0.98	2.92
Average		0.63	1.01	1.64	0.44	1.03	3.10
LSD 0.05		0.26	0.29	0.46 ns	0.17 ns	0.12 ns	0.59 ns
CV %		18.1	13.1	12.5	17.2	4.9	8.4
† 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					
Notes		Additional maturity comments at harvest date for varieties not yet headed.					

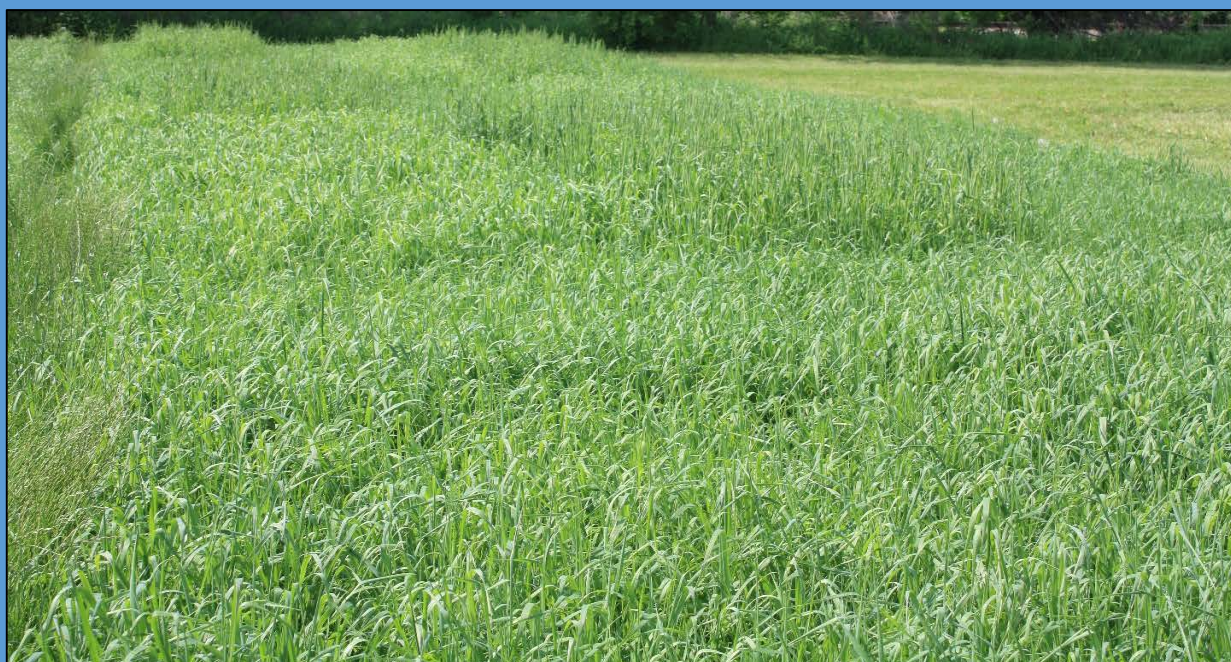


Table 28. 2018 DM Yields (DM tons/acre) of MSU Fescue (Tall and Meadow), Orchardgrass, Perennial Ryegrass, and Timothy Grass Variety Trials Seeded in July 2017 in Lake City, Michigan.

Fescue	Heading Date	2018 Yields, Two-cuts and Total		
		June 20	Sep 24	Total
Tall Fescue				
Kentucky 31 minus	6/7/2018	3.12	1.83	4.94
Florine	6/7/2018	2.89	1.96	4.85
Swaj	6/10/2018	2.87	1.96	4.83
LSD 0.05 (Tall Fescue)		0.38	0.24	0.45 ns
Meadow Fescue				
Pradel	6/7/2018	2.73	1.37	4.09*
SW Minto	6/8/2018	2.15	1.21	3.37
LSD 0.05 (Meadow Fescue)		0.38	0.14	0.26
Average		2.75	1.67	4.42
LSD 0.05 (All Fescue)		0.30	0.16	0.31
CV %		7.0	6.4	4.6
Orchardgrass				
	Heading Date	2018 Yields, Two-cuts and Total		
		June 20	Sep 24	Total
Potomac	5/31/2018	2.33	1.71	4.04*
Lucharm	Vegetative	1.91	1.74	3.65
Lukir	Vegetative	1.80	1.66	3.46
Average		2.01	1.70	3.72
LSD 0.05		0.11	0.24	0.33
CV %		3.0	8.3	5.2
Perennial Ryegrass				
	Heading Date	2018 Yields, Two-cuts and Total		
		June 20	Sep 24	Total
Federo (Festulolium)	6/10/2018	2.77	1.03	3.81*
Tomaso	6/17/2018	2.67	0.79	3.46
Linn	6/3/2018	2.20	0.78	2.98
Average		2.55	0.87	3.42
LSD 0.05		0.15	0.13	0.20
CV %		3.5	8.7	3.4
Timothy				
	Heading Date	2018 Yields, Two-cuts and Total		
		June 20	Sep 24	Total
Climax	6/16/2018	2.97	1.15	4.12
KY Early Timothy	6/6/2018	2.61	1.43	4.05
Average		2.79	1.29	4.08
LSD 0.05		0.34	0.20	0.34 ns
CV %		7.0	8.9	4.8
* 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 29. Michigan State University Perennial Grass Variety Trial Seeding-Year Yields of Perennial ryegrass and Festulolium. Michigan State University Agronomy Farm, East Lansing, Michigan. Seeded in late July 2018.

Variety	Type	Cut 1 Oct 30	Variety	Type	Cut 1 Oct 30
Garbor	Perennial ryegrass	1.51	Perun	Fest (ryegrass type)	1.11
ROM 99 †	Perennial ryegrass	1.38	LP 17253 †	Perennial ryegrass	0.93
Hostyn	Fest (ryegrass type)	1.32	Lofa	Fest (ryegrass type)	0.82
Dexter 1	Perennial ryegrass	1.31	Bison 2	Hybrid/Intermediate	0.80
Remington	Perennial ryegrass	1.29	Linn	Perennial ryegrass	0.59
Average		1.11			
LSD 0.05		0.18			
CV %		11.6			

† Experimental Variety

Comments: Three trials were established at this location in 2018. (Ryegrass, Fescue, and Timothy)
 Soil was not firm enough (wet) to harvest the fescue trial this fall.
 The growth on timothy was not enough to harvest.



Table 30. Michigan State University Annual Grass Variety Trial Yields (DM tons/acre) Michigan State University Agronomy Farm, East Lansing, Michigan. Seeded May 2017

Variety		Winter Survival	Heading Date	2018 DM Yields T/A, 2-cuts and Total			2017 Total
				Cut 1 May 26	Cut 2 June 29	2018 Total	
Fox	Italian Ryegrass	8.8	5/26/2018	1.89	1.05	2.93	1.42
Meroa	Italian Ryegrass	9.0	5/25/2018	1.98	0.92	2.90	1.48
LM16371 †	Italian Ryegrass	8.3	5/25/2018	1.84	0.88	2.73	1.10
Firkin	Italian Ryegrass	8.8	5/26/2018	1.83	0.80	2.63	1.25
Barextra	Italian Ryegrass	7.3	5/25/2018	1.78	0.81	2.60	1.30
LM16370 †	Italian Ryegrass	9.0	5/26/2018	1.82	0.75	2.57	1.18
Marshall	Annual Ryegrass	5.8	5/21/2018	1.61	0.75	2.36	1.88
SIRG 16A †	Italian Ryegrass	8.8	5/26/2018	1.74	0.63	2.36	1.38
Average		8.2		1.81	0.82	2.63	1.37
LSD 0.05		1.0		0.19	0.19	0.32	0.20
CV %		7.1		7.3	16.4	8.3	9.3

† Experimental Variety

Cuttings - Three in 2017, two in 2018. Very little regrowth after second cutting in 2018.

Winter Survival - Ten is highest, zero is no winter survival

Oat varieties planted in 2017 did not survive the winter.



Table 31. Michigan State University Red Clover Variety Trial Yields (DM tons/acre) East Lansing, Michigan. Seeded May, 2017

Variety	2018 DM Yields T/A, Four-cuts and Total					Seeding year	Trial Total
	June 8	July 9	Aug 13	Oct 19	Total		
RC0705 †	2.62	0.80	0.63	0.93	4.97	1.31*	6.28
Evolve	2.90	0.60	0.48	0.96	4.94	1.08	6.02
Common	2.67	0.97	0.51	0.91	5.07	0.94	6.01
Redkin	2.59	0.66	0.54	0.87	4.66	1.14*	5.80
LS9703	2.38	0.67	0.44	1.02	4.52	1.08	5.60
Average	2.63	0.74	0.52	0.94	4.83	1.11	5.94
LSD 0.05	0.37	0.16	0.17	0.09	0.62 ns	0.18	0.69 ns
CV%	11.6	17.7	27.6	8.2	10.7	13.8	9.6

† 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

Marketers	Phone	Web Addresses
AgResearch Ltd	828-645-3872	www.agresearchusa.com
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 Hybrids	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 Zealand)	+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
Great Lakes hybrids	800-257-7333	www.greatlakeshybrids.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
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