

2016 Michigan Forage Variety Test Report

Kim Cassida, Joe Paling, and Christian Kapp

Forage Factsheet #17-01

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 2016, and a one-ton increase of average quality alfalfa hay yield was worth \$130 to 160/acre.

2016 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**. Winter temperatures were mild in 2016. April was cool, with precipitation greater than usual, and below normal temperatures continued through the first half of May. Planting of many crops was delayed in the spring. Alfalfa seedlings at East Lansing in mid-April grew slowly for the first month. Forage seedlings that were delayed until May dealt with the dry conditions that prevailed in southern Michigan, where East Lansing was well below normal rainfall in June through the first part of July. Second cutting yields of alfalfa were low and yields of cool-season grasses were very low. Lake City rainfall was slightly below the 30-year average in both May and June. Monthly precipitation totals at Chatham in the Upper Peninsula were near normal for most of the summer.

2016 Alfalfa Summary.

In 2016, alfalfa was cut four times at East Lansing and three times at Lake City and Chatham. The established grass variety trials at East Lansing were cut three times in 2016. Alfalfa maturity was later in 2016 and harvest

of trials did not begin at East Lansing until June 1, later than in 2015 and about 1 week later than the desired last week of May. First cutting of all alfalfa and grass trials on campus was complete on June 9, a few days later than in 2015. Harvest was on schedule at each of the two northern locations in 2016. Producers in the Lake City area had begun harvesting a few days earlier than the trials were harvested at the experiment station. First cutting at Chatham was on June 20 in 2016.

Total test yields of alfalfa varieties planted at multiple locations in Michigan variety trials since 2008 are listed in **Tables 4 through 7**. Total yields for previous years and individual cuttings and total for 2016 are in **Tables 11 to 19**.

At East Lansing, average total yield for conventional alfalfa varieties planted in 2013 was 5.6 and the highest was 6.2 tons/acre. Roundup Ready (RR) alfalfa varieties planted in 2013 averaged 5.2 and ranged from 5.0 to 5.4 tons/acre in 2016. The highest yielding alfalfa test at East Lansing in 2016 was from the 2014 seeding year, which was only cut 3 times in 2015 because of the frequent heavy rain and wet soil conditions. Thirteen conventional varieties averaged 7.0 and ranged from 6.4 to 7.8 tons/acre. The five RR varieties ranged from 6.4 to 6.7 tons/acre. The 2015 Conventional and RR trial seedlings survived frequent flooding in 2015 to yield between 4.4 and 5.8 tons/acre in 2016. The alfalfa variety 'Vernal' was one of the lowest yielding in 2016 and was 17 to 30 percent lower than the highest producing varieties. Vernal is susceptible to phytophthora root rot (PRR) in wet soils, and therefore plant vigor and stand population suffered from the wet conditions experienced at East Lansing in 2015.

At Lake City, greatest yield in 2016 was obtained from the new 2015 seeding. Average yield in the conventional trial was 4.6 and ranged from 4.3 to 5.0 tons/acre. Yields in the RR variety trial averaged 3.9 and ranged from 3.8 to 4.2 tons/acre. In the 2014 seeding, average total yield of the conventional varieties was 3.1



and ranged from 2.4 to 3.6 and the RR varieties average was 2.7, ranging from 2.5 to 2.8 tons/acre. Yields were low in the final year of the 2013 trial at Lake City, where total yield of the conventional and RR varieties, respectively, averaged only 1.9 (range from 1.8 to 2.0) and 2.1 tons/acre (range from 1.9 to 2.1).

At Chatham, alfalfa trials seeded in 2013 and 2015 were harvested in 2016. Average yield in the 2015 conventional seeding was 3.0 and ranged from 2.8 to 3.3 tons/acre. Yield of the 2015 RR seeding averaged 3.1 and ranged from 2.9 to 3.2 tons/acre. Total 2016 yield from the 2013 seedings averaged 3.2, ranging from 3.1 to 3.4 tons/acre in the conventional trial. All three varieties in the RR trial at Chatham yielded 3.1 tons/acre in 2016.

2016 Perennial Grass Summary

Six grass species are currently being evaluated for yield, maturity at first cutting, and persistence. Orchardgrass, fescues, festuloliums, brome-grasses, ryegrasses, timothy, and Kentucky bluegrass have been established at all 3 locations. 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**. Plant maturity ratings are in **Table 10**. Total yield for previous years, plant maturity at first cut, individual cut and total yield in 2016 are in **Tables 29 to 38**.

To contact an expert in your area, visit people.msue.msu.edu, or call 888-MSUE4MI (888-678-3364).

Table 1. Actual and 30-year average precipitation (Inches) from April to October 2010 to 2016 at three variety test sites across Michigan.								
	2010	2011	2012	2013	2014	2015	2016	Avg
	East Lansing							
Apr	2.37	5.21	1.53	7.78	1.07	1.10	1.22	2.87
May	5.10	6.81	3.40	4.35	3.66	4.83	2.97	3.18
June	4.70	1.85	1.50	5.23	5.60	7.23	0.97	3.67
July	2.15	4.76	1.80	2.49	2.97	2.89	3.76	3.13
Aug	0.71	3.50	2.70	5.74	5.33	6.15	6.83	3.69
Sept	3.79	2.09	2.52	0.89	4.49	4.34	3.47	3.61
Oct	1.35	3.08	4.69	5.24	2.41	1.92	3.70	2.75
Total	20.17	27.30	18.14	31.72	25.53	28.46	22.92	22.90
	Lake City							
Apr	3.09	7.09	2.20	5.09	6.58	2.58	2.20	2.95
May	2.35	2.44	5.30	3.02	3.29	4.57	2.26	3.22
June	4.69	4.11	3.03	1.87	2.94	2.91	2.21	3.39
July	5.18	2.15	7.32	2.03	3.17	2.25	5.74	2.81
Aug	2.77	3.61	1.97	4.15	1.69	4.10	2.25	3.72
Sept	2.97	2.61	3.45	1.66	4.07	4.14	3.30	3.63
Oct	1.36	3.85	4.35	3.09	4.29	2.78	3.07	3.30
Total	22.41	25.86	27.62	20.91	26.03	23.33	21.03	23.02
	Chatham							
Apr	0.95	3.35	1.05	3.30	3.32	2.03	3.21	2.15
May	1.61	3.10	2.43	2.20	3.36	5.60	3.45	3.05
June	6.82	4.03	4.34	2.77	3.85	2.67	2.34	3.02
July	5.73	1.41	4.47	4.78	4.27	2.15	3.44	3.41
Aug	1.96	0.73	2.12	2.68	3.18	1.86	3.67	3.17
Sept	8.62	5.26	5.13	2.71	3.53	2.41	4.78	4.21
Oct	2.18	2.75	5.55	3.06	6.98	4.25	6.90	4.47
Total	27.87	20.63	25.09	21.50	28.49	20.97	27.79	23.48

Distribution of grass yields across cuttings was typical. Highest yields were obtained with the first cutting. Second-cut yields (East Lansing and Lake City) were lower due to the warmer and somewhat dry conditions experienced in mid-summer. Among cool-season grasses, tall fescue and orchardgrass were the most productive in the middle of summer. After the return of cooler temperatures and adequate rainfall, the third and final cuttings in September (Lake City) and October (East Lansing) produced more than in mid-summer. At Chatham, two cuttings were taken for all grasses except perennial ryegrass and timothy which were only cut once.

At East Lansing, established trial yield of fescues ranged from 2.6 to 4.4, orchardgrass from 3.0 to 3.7, timothy from 2.9 to 4.5, perennial ryegrass from 2.2 to 3.6,

bromegrass from 3.1 to 4.0 tons/acre, and two 2 varieties of Kentucky bluegrass, respectively, yielded 2.9 and 3.2 tons/acre in 2016.

At Lake City, greatest grass yields were obtained in the 2015 seeding. Three-cut total yield, in tons/acre, of orchardgrass averaged 4.9 and ranged from 4.5 to 5.4, fescues averaged 5.3 and ranged from 4.9 to 5.7, timothy averaged 5.5 and ranged from 5.4 to 5.8, and perennial ryegrass averaged 4.6 and ranged from 4.3 to 4.9. Two varieties of bromegrass yielded 5.4 and 5.5 tons/acre and both varieties of Kentucky bluegrass yielded 1.6 tons/acre in 2016. Yields from the 2014 seeding, located on a slightly sandier soil, were not as high. Several varieties of orchardgrass, tall fescue, and timothy are in both trials. In the 2014 trial, total yield of orchardgrass ranged from 2.8 to 3.1, tall

fescue ranged from 2.0 to 2.2 and timothy ranged from 2.6 to 2.8 tons/acre.

The Chatham trials contain many of the same grass varieties as the Lake City trials. Chatham is farther north where only 1 to 2 cuts per year may be feasible, depending on species. First cutting was in June and second cutting in September. Orchardgrass, fescue (tall and meadow), bromegrass, and Kentucky bluegrass trials were cut twice in 2016, but perennial ryegrass and timothy trials were only cut once. Average total yields in the 2014 seeding for orchardgrass was 1.9 (range 1.8 to 2.0), tall fescue was 2.2 (range 1.8 to 2.5) and timothy was 1.7 (range 1.5 to 2.0) tons/acre. In the 2015 trial, orchardgrass averaged 2.3 and ranged from 2.1 to 2.5, fescues averaged 2.5 and ranged from 2.0 to 2.7, timothy averaged

1.4 and ranged from 1.0 to 1.8, and perennial ryegrass averaged 1.2 and ranged from 0.9 to 1.7 tons/acre. Two varieties each of brome grass yielded 1.6 and 2.0 and Kentucky bluegrass were 1.0 and 1.1 tons/acre in 2016.

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 plots were harvested. Maturity dates spanned up to 17 days from earliest to latest within species at East Lansing, and up to 8 days at the two northern locations. Using 'Potomac' orchardgrass check as a marker, grasses generally reached 50% heading 14 days later in Lake City and Chatham than at East Lansing.

ALFALFA VARIETY TEST

Michigan State University has evaluated 124 commercially available alfalfa varieties in its alfalfa variety trials since 2008. 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 2016 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. Yield is expressed in dry matter tons per acre as an average over years for 65 alfalfa varieties seeded at East Lansing (2008-2014) and as single-year yield for the 2015 seeding. Because glyphosate is used for weed control in Roundup-Ready trials, these are conducted as separate tests from conventional varieties. Vernal, a public variety released in 1953 that has good winter-hardiness (FD 2) and 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 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. **Multifoliolate** varieties have a gene for more than three leaflets per leaf. Varieties with high **Standability** are resistant to lodging. Varieties with high **Salt Tolerance** can tolerate

salts in irrigation water.

Fall Dormancy and Winterhardiness Ratings.

Fall dormancy is no longer considered to be the same thing as winterhardiness. Fall dormancy (FD) ratings are determined by the amount of regrowth after a mid-September cutting, but this rating is also correlated with speed of regrowth in any cutting. Moderately dormant (FD = 5) varieties mature 4-5 days earlier, grow back faster, and often yield more than dormant (FD = 3-4) or very dormant (FD = 1-2) varieties in early years of stands, but are less persistent in Michigan than dormant varieties. Therefore, after five years dormant varieties often yield more than moderately dormant ones, especially in Northern Michigan. 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. Within FD ratings, varieties can differ considerably for winterhardiness, which is measured as the winter survival index (WSI). In Michigan, select alfalfa varieties with WSI of 3 or less. 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, but 70 to 85% are susceptible. Therefore, a variety classified as resistant may also 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 pictures of alfalfa diseases may be found by following a link located at <http://Forage.msu.edu/extension/> and then [Alfalfa Analyst, 3rd edition](#) (Undersander et al.) a pictorial key to alfalfa pests and diseases.

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 on heavy or poorly drained soils. Any soil, however, when saturated during a rainy period of seven to ten days may result in severe injury, 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 for three to four years 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.

Potato Leafhopper (PLF). *Empoasca fabae* is a sucking insect that is the most serious insect pest of Michigan alfalfa. PLF-tolerant varieties have leaf hairs that interfere with insect feeding and reduce damage. Varieties with this trait usually yield slightly less than similar varieties without the trait.

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 five-cut systems are possible in southern Michigan, but it is rarely practical to get more than three 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= 3-5), winterhardy (WSI rating 1 to 3), 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 in Michigan, select dormant (FD = 2-4), winterhardy (WSI 1 to 3) varieties with high yields and resistance to BW, AN, PRR, and VW. The reliability of variety rankings increase 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 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 3 locations since 2013. More than 50 varieties have been evaluated at East Lansing since 2011 and more than 25 varieties have been planted at Lake City or Chatham since 2014. Each test was seeded as a randomized complete block design using four replications. Plot lengths are typically at least 20 ft long and range from 3 to 5 ft wide, depending on location and space available. Nitrogen fertilizer is applied at green-up in early April and after each cutting. Dry matter yields, multi-year averages and first year totals, for trials seeded from 2006 to 2015 at East Lansing are presented in

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 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 bromegrass** is one of the most winter-hardy grasses in Michigan and can be grown on a wide range of soil types. Smooth bromegrass 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 traditionally late-maturing grass that 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 known for good fall growth and stockpiling potential. Tall fescue is persistent under frequent short grazing, heavy traffic, drought, and poor drainage on many soil types. Many new varieties of **tall fescue** are endophyte-free or contain novel endophytes that are not toxic to animals as are endophytes in older varieties. 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.

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. Kentucky bluegrass is more suitable for grazed than harvested forage systems.

ANNUAL GRASS TESTS

Annual grass trials were established 2015 at East Lansing. Annual grass trials are planted in plots 4 ft wide by at least 20 ft long. Harvest area was from the center 3 ft (6 rows) of each plot. Weed control was not needed in these trials, and both were fertilized with 50 lbs/acre N prior to first cutting and after cuts 1 and 2 in the seeding year. Varieties of Annual (Westerwold), Italian ryegrass, Festulolium, and Teffgrass were evaluated. Teffgrass, which does not survive killing frost, died in the fall of 2015 as expected and was the only species that did not grow in 2016. The surviving varieties were harvested twice in 2016. Total and per cutting yield for 2016 and total yield for 2015 are listed in **Table 39**.

SUDANGRASS, SORGHUM SUDANGRASS & FORAGE SORGHUM

Two separate trials of Sudangrass and forage Sorghums were established in 2016. Eight varieties of Sudangrass or Sorghum-Sudangrass hybrids were planted in a multi-cut trial and 4 varieties of forage Sorghum were planted in a single harvest trial. Both trials were planted in late June at East Lansing during the dry weather. Germination was slow and variable until adequate rainfall occurred in early July. The multi-cut trial was harvested in late August and again in early October. The single cut trial was also harvested in early October and both were cut prior to a frost. Yields and regrowth plant height of the multiple-cut Trial and yield, percent moisture, and plant height for the single-cut Trial are in **Table 40**.

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 across the numbers of 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 percent 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 actual yields among varieties should only be made within a Trial on a single date or for yields summed across dates. 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>.

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

	Seeding rate (lb/acre) †	Seeds/lb (approx.)	Ease of establishment	Stand life (yr)	Acid	Wet	Drought	Cold	Heat	Pasture	Hay
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.

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
727	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	NEXGROW
5312	3	-	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	-	Check Variety
5454	4	-	R	HR	HR	HR	HR	LR	-	MR	-	-	-	-	-	Check variety
6415	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	NEXGROW
6417	4	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	H	-	-	NEXGROW
6426	4	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	-	-	-	NEXGROW
6431	4	2	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	-	NEXGROW
6552	5	-	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	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
4P424	4	-	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
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
8420	4	2	HR	HR	HR	HR	HR	HR	HR	HR	-	-	M	-	-	Wilbur-Ellis
8444R	4	3	HR	HR	HR	HR	HR	HR	HR	HR	RR	-	M	G/F	-	Wilbur-Ellis
8450	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Wilbur-Ellis
9200 RR	4	1.5	HR	HR	HR	HR	HR	HR	-	-	RR	-	-	-	-	Great Lakes Hybrids
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
Ascend	3	-	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	-	Hyland Seeds
Caliber	4	2	HR	HR	HR	HR	HR	HR	MR	MR	-	-	-	-	-	Beck's Hybrid
Chesapeake	3	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	Dahlco/AgReliant
Cimarron VL410	4	-	HR	HR	R	R	HR	MR	-	R	-	-	-	-	-	Cimarron Seed
Contender	5	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Beck's Hybrid
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
DK140	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Check variety
DKA33-16	3	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Monsanto
DKA40-51RR	4	1	HR	HR	HR	HR	HR	HR	HR	R	RR	-	-	-	-	Monsanto
DKA41-18RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Monsanto
DKA43-13	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Monsanto
DKA43-22RR	4	2	HR	HR	HR	HR	HR	HR	R	HR	RR	-	H	-	-	Monsanto
DKA44-16RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	Monsanto
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	-	-	-	-	-	-	Beck's Hybrid
ForageGold	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	M	-	-	Renk Seed
FSG 329	3	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	L	-	-	Forage First
FSG 351	3	2	HR	HR	R	R	HR	R	-	R	-	-	-	-	-	Forage First
FSG 400 LH	4	-	HR	HR	HR	HR	HR	HR	-	-	-	HR	-	-	-	Forage First
FSG 403LR	4	2	HR	HR	HR	HR	HR	HR	R	R	-	-	-	-	R	Forage First
FSG 406	4	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Forage First
FSG 408DP	4	2	HR	HR	HR	R	HR	R	-	R	-	-	-	-	-	Forage First
FSG 415 BR	4	2	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	-	Farm Science
FSG 420 LH	4	2	HR	HR	HR	HR	HR	HR	-	R	-	HR	L	-	-	Forage First
FSG 424	4	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	H	G	-	Forage First
FSG 426	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	H	-	-	Farm Science
FSG 505	5	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Forage First
FSG 528 SF	5	2	HR	R	HR	HR	R	R	-	-	-	-	-	-	-	Forage First
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
Genoa	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	NEXGROW
Gunner	5	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Croplan Genetics

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
Hi-Gest 360	3	1.5	HR	HR	HR	HR	HR	HR	HR	-	-	-	M	-	-	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
HybriPro BR	5	-	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Hyland Seeds
KingFisher 243	5	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Byron Seeds
KingFisher 4020	4	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Byron Seeds
KF-406 A2	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Byron Seeds
KF-425 HD	5	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Byron Seeds
L333HD	3	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Legacy Seeds
L447HD	4	2	HR	HR	HR	R	HR	HR	-	-	-	-	-	-	-	Legacy 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
Red Falcon BR	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Blue River Hybrids
RR AphaTron 2XT	4	1	HR	HR	HR	HR	HR	HR	HR	-	RR	-	H	G	-	Croplan Genetics
RR Alf 4R100	4	2	HR	HR	HR	HR	HR	HR	-	MR	RR	-	H	-	-	Monsanto
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	-	Monsanto
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
SpringGold	5	-	HR	HR	HR	R	HR	HR	-	R	-	-	-	-	-	Renk 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
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 = Potoato leafhopper resistance, Multi = Multifloiate 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 2008 to 2015

Last Listing, Michigan from 2008 to 2015										
Variety	Marketer	Three-year average						2-yr avg	1-yr total	(Number) †
		2008	2009	2010	2011	2012	2013	2014	2015	% Vernal ††
----- dry matter tons/acre -----										
727	NEXGROW	6.74	-	-	-	-	-	-	-	(1)126
6415	NEXGROW	6.37	-	-	-	-	-	-	-	(1)119
6417	NEXGROW	7.06	-	6.36	-	-	-	-	-	(2)123
6431	NEXGROW	6.93	-	-	-	-	-	-	-	(1)130
6552	NEXGROW	6.46	-	-	-	-	-	-	-	(1)121
4S417	Mycogen Seeds	7.30	6.36	6.38	-	-	-	-	-	(3)128
6422Q	NEXGROW	-	7.29	-	6.19	-	-	-	-	(2)130
6585Q	NEXGROW	-	-	-	-	-	6.13	-	-	(1)117
AlfaFour Supreme	CHS Seed	-	-	-	6.79	-	-	-	-	(1)120
AmeriStand 403T	America's Alfalfa	-	6.08	-	-	-	-	-	-	(1)125
Ameristand 407TQ	America's Alfalfa	-	6.98	-	6.28	-	-	-	-	(2)127
Caliber	Beck's Hybrids	-	-	-	-	-	-	6.32	4.51	(1)109
Chesapeake	Dahlco/AgReliant	-	6.79	-	-	-	-	-	-	(1)140
Contender	Beck's Hybrids	-	-	-	-	6.21	-	6.32	5.06	(1)108
DG 4210	Crop Production	-	-	6.56	6.23	-	6.16	-	-	(3)115
DKA43-13	Monsanto	6.81	-	6.31	-	-	-	-	-	(2)121
Everlast II	Legacy Seeds	-	6.06	-	-	-	-	-	-	(1)125
Enduro Elite	Cisco Seeds	-	-	-	-	-	-	6.19	-	(1)108
FF42.A2	Lacrosse Seeds	-	-	-	-	-	-	-	5.28	-
Fierce	Beck's Hybrids	-	-	-	-	-	-	6.39	5.45	(1)111
ForageGold	Renk Seed	-	6.39	-	-	5.79	-	-	-	(2)116
FSG 415 BR	Forage First	-	-	-	-	-	-	-	5.83	-
FSG 403LR	Forage First	-	-	-	-	-	6.04	-	-	(1)115
FSG 424	Forage First	-	-	-	-	-	6.30	-	-	(1)120
FSG 426	Forage First	-	-	-	-	-	-	-	4.93	-
GA 409	Preferred Alfalfa Gen	-	-	-	-	-	-	6.27	-	(1)109
Gunner	Croplan Genetics	-	-	-	5.83	-	-	-	-	(1)103
HybriForce 2400	Dairyland Seed	7.55	6.68	6.27	-	-	-	-	-	(3)131
HybriForce 3400	Dairyland Seed	-	-	-	6.50	7.00	6.43	-	5.16	(3)119
HybriForce 3400 QR	Dairyland Seed	-	-	-	-	6.63	-	-	-	(1)114
HybriPro BR	Hyland Seeds	-	-	-	-	-	-	6.25	-	(1)109
KingFisher 243	Byron Seed	-	6.20	-	-	-	-	-	-	(1)128
KingFisher 4020	Byron Seed	-	-	6.32	-	-	-	-	-	(1)114
L333HD	Legacy Seeds	6.30	-	-	-	-	-	-	-	(1)118
L447HD	Legacy Seeds	6.92	-	-	-	-	-	-	-	(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)118
Magnitude	Allied Seed	-	-	-	-	6.49	-	-	-	(1)112
Mariner IV	Allied Seed	-	-	-	-	6.31	-	-	-	(1)109
Oneida VR	public	-	5.42	-	5.56	-	5.53	5.88	-	(4)104
PGI 459	Alforex	6.45	-	-	-	-	-	-	-	(1)121
PGI 529	Alforex	-	-	-	-	-	6.66	-	-	(1)127
PGI 557	Alforex	-	-	-	6.11	-	-	-	-	(1)108
Pioneer 53H92	Pioneer	-	6.13	-	-	-	-	-	-	(1)126
Pioneer 54Q14	Pioneer	-	-	-	-	-	-	6.11	-	(1)106
Pioneer 54Q32	Pioneer	-	6.50	-	6.03	-	-	-	-	(2)120
Pioneer 54QR04	Pioneer	-	-	-	-	-	5.95	-	-	(1)114
Pioneer 55Q27	Pioneer	-	-	-	-	-	6.38	6.69	5.20	(2)119
Pioneer 55V12	Pioneer	-	6.78	-	6.23	6.08	-	-	-	(3)118
Pioneer 55V48	Pioneer	7.07	7.28	-	-	-	-	-	-	(2)141
Pioneer 55V50	Pioneer	-	-	-	6.85	6.95	6.59	-	-	(3)122
Prolific II	Hyland Seeds	-	-	-	6.54	-	-	6.25	-	(2)112
Radiance HD	Legacy Seeds	-	6.91	-	-	-	-	-	-	(1)142
Rebound 6.0	Croplan Genetics	-	-	-	6.01	-	-	-	-	(1)106
SolarGold	Renk Seed	-	-	-	6.39	6.31	-	-	-	(2)111
Sonic	Nutech Seed	-	-	-	6.21	-	-	-	-	(1)110
StarGold	Renk Seed	-	-	-	-	-	-	6.52	-	(1)113
Velocity	Nutech Seed	7.01	6.10	-	-	-	-	-	-	(2)128
Vernal	public	5.35	4.85	5.53	5.67	5.80	5.23	5.75	4.42	(7)100
WL343HQ	W-L Research	-	-	5.81	-	-	-	-	-	(1)105
WL354HQ	W-L Research	-	-	-	5.97	-	-	-	-	(1)105
WL363HQ	W-L Research	7.00	6.84	6.26	-	-	-	-	-	(3)128
5312	check	5.79	5.83	6.06	-	-	-	-	-	(3)112
5454	check	-	6.26	-	-	-	-	-	-	(1)129
DK140	check	-	6.06	-	-	-	-	-	-	(1)125
PLH-resistant	check	-	-	5.59	5.79	-	-	-	-	(2)102
Mean		6.69	6.38	6.13	6.17	6.36	6.12	6.25	5.09	116

† 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

Table 5. Long-term yield averages (dry matter tons/acre) from MSU Alfalfa Variety Trials seeded in Lake City, Michigan from 2008 to 2015.

Three-year Average								2-yr	1-yr	(Number) †
Variety	Marketer	2008	2009	2010	2011	2012	2013	avg	total	% Vernal ††
----- dry matter tons/acre -----										
6417	NEXGROW	-	-	4.90	-	-	-	-	-	(1)114
6431	NEXGROW	3.17	-	-	-	-	-	-	-	(1)133
4A415	Mycogen Seeds	-	-	5.19	-	-	-	-	-	(1)120
4S417	Mycogen Seeds	-	3.84	5.18	-	-	-	-	-	(2)117
6200HT	NEXGROW	-	-	-	-	-	-	-	-	(1)115
6305Q	NEXGROW	-	-	4.91	-	-	-	-	-	(1)114
6422Q	NEXGROW	-	3.99	-	-	-	-	-	-	(1)119
AmeriStand 403T plus	America's Alfalfa	-	3.48	-	-	-	-	3.07	4.50	(2) 96
AmeriStand 407TQ	America's Alfalfa	-	3.81	-	4.65	-	-	-	-	(2)107
Ascend	Hyland Seed	-	-	-	-	-	-	-	-	(1)108
Chesapeake	Dahlico/AgReliant	-	3.81	-	-	-	-	-	-	(1)113
Cimarron VL410	Spink/Cimarron Seed	-	-	-	-	-	-	-	-	(1)105
DG 3210	Crop Production	-	-	4.62	-	-	-	-	-	(1)107
DG 4210	Crop Production	-	-	4.87	4.63	-	2.58	3.16	4.46	(4)102
DKA43-13	Monsanto	-	3.73	-	-	-	-	-	-	(1)111
ForageGold	Renk Seed	-	-	-	-	3.89	-	-	-	(1)95
FSG 329	Forage First	-	4.09	-	-	-	-	-	-	(1)122
HybriForce 2400	Dairyland Seed	-	-	4.87	-	-	-	-	-	(1)113
HybriForce 3400	Dairyland Seed	-	-	-	-	4.31	-	3.48	4.99	(2)103
Hi-Gest 360	Alforex	-	-	-	-	-	-	3.22	-	(1) 93
L455HD	Legacy Seeds	-	-	-	-	-	2.77	3.76	4.35	(2)108
LegenDairy 5.0	Croplan Genetics	-	4.11	-	-	-	-	-	-	(1)122
Magnum 7 WET	Dairyland Seed	-	-	-	-	-	-	3.55	4.59	(1)103
Mariner IV	Allied Seed	-	-	-	-	-	-	3.71	4.62	(1)108
Oneida VR	public	-	-	-	-	-	2.61	3.58	4.85	(2)103
Octane	Brett Young	-	-	-	-	-	-	3.32	-	(1) 97
Pioneer 54Q32	Pioneer	-	3.99	-	4.59	3.99	-	-	-	(3)105
Pioneer 54Q14	Pioneer	-	-	-	-	-	-	3.04	4.29	(1) 88
Pioneer 54QR04	Pioneer	-	-	-	-	-	2.56	-	-	(1)100
Pioneer 55H94	Pioneer	-	-	-	4.39	-	-	-	-	(1) 95
Pioneer 55Q27	Pioneer	-	-	-	-	-	2.59	3.61	4.41	(2)103
Pioneer 55V12	Pioneer	-	3.52	-	4.36	3.98	-	-	-	(3) 99
Pioneer 55V48	Pioneer	2.84	3.52	-	-	-	-	-	-	(2)112
Pioneer 55V50	Pioneer	-	-	-	4.80	4.09	2.73	3.71	4.82	(4)104
Prolific II	Hyland Seed	-	-	-	-	-	-	3.71	4.67	(1)108
SolarGold	Renk Seed	-	-	-	-	3.90	-	-	-	(1) 96
Sonic	Nutech Seed	-	-	-	4.52	-	-	-	-	(1) 98
StarGold	Renk Seed	-	-	-	-	-	-	3.33	-	(1) 97
Velocity	Nutech Seed	2.97	3.95	-	-	-	-	-	-	(2)120
Vernal	public	2.39	3.36	4.31	4.61	4.08	2.55	3.44	4.52	(7)100
WL 354HQ	W-L Research	-	-	-	-	-	-	2.98	-	(1) 87
5312	check	-	-	4.69	4.72	-	-	-	-	(2)106
DK140	check	-	3.46	-	-	-	-	-	-	(1)103
PLH-resistant	check	2.56	3.68	4.52	4.16	-	-	-	-	(4)103
Mean		2.79	3.76	4.81	4.54	4.03	2.63	3.42	4.59	106

† 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

Table 6. Long-term yield averages (dry matter tons/acre) from MSU Alfalfa Variety Trials seeded in Chatham, Michigan between 2008 and 2015.

Dry Matter Tons/Acre Between 2008 and 2013							
Variety	Marketer	3-year average				1-yr total	(Number) †
		2008	2009	2012	2013	2015	% Vernal ††
----- 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	-	-	2.91	(1)106
Ameristand 407TQ	America's Alfalfa	3.45	2.96	-	-	-	(2)100
DG 4210	Crop Production	-	-	-	3.74	3.02	(1)106
DKA 33-16	Monsanto	3.70	-	-	-	-	(1)106
DKA 43-13	Monsanto	-	3.23	-	-	-	(1)111
Evergreen 3	NEXGROW	3.23	-	-	-	-	(1) 92
ForageGold	Renk Seed	-	-	3.13	-	-	(1) 98
HybriForce 3400	Dairyland	-	-	-	-	3.29	-
L455HD	Legecy	-	-	-	-	3.11	-
Magnum 7 WET	Dairyland	-	-	-	-	2.97	-
Mariner IV	Allied Seed	-	-	3.13	-	2.85	(1) 98
Oneida VR	Public	-	-	-	-	2.85	-
Pioneer 53H92	Pioneer	-	2.88	-	-	-	(1) 99
Pioneer 54Q32	Pioneer	-	3.28	-	-	-	(1)113
Pioneer 55Q27	Pioneer	-	-	-	-	3.18	-
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	-	-	-	-	3.07	-
SolarGold	Renk Seed	-	-	3.61	-	-	(1)113
StarGold	Renk Seed	-	-	-	-	3.06	-
Velocity	Nutech Seed	3.55	3.05	-	-	-	(2)103
Vernal	Public	3.50	2.90	3.19	3.53	2.77	(2)100
WL343HQ	W-L Research	3.55	-	-	-	-	(1)101
WL354HQ	W-L Research	-	-	-	-	2.86	-
5312	check	-	3.27	-	3.53	-	(2)106
DK140	check	3.40	3.01	-	-	-	(2)100
Mean		3.52	3.08	3.32	3.62	3.00	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



Table 7. Yields of Roundup Ready Alfalfa Varieties (dry matter tons/acre) seeded from 2013 to 2015 at East Lansing, Lake City, and Chatham, Michigan .

Variety	Marketer	East Lansing				Lake City				Chatham		
		2013 †	2014 ††	2015 †	(Number)	2013 †	2014 †	2015 †	(Number)	2013 †	2015 †	(Number)
		3-year avg	2-year avg	1-year Total	% Mean ‡	3-year avg	2-year avg	1-year Total	% Mean ‡	3-year avg	1-year Total	% Mean ‡
		----- dm tons/acre -----				----- dm tons/acre -----				-- dm tons/acre --		
428RR	Allied Seed	6.01	-	-	(1)102	-	-	-	-	-	-	-
430RRLH	Allied Seed	-	-	4.81	-	-	-	-	-	-	-	-
6497R	NEXGROW	5.94	-	-	(1)101	-	-	-	-	-	-	-
AmeriStand 455TQ RR	America's Alfalfa	5.81	-	-	(1)99	-	-	-	-	-	-	-
DKA40-51RR	Monsanto	-	5.46	5.35	(1)99	-	2.76	3.77	(1)94	-	2.91	-
DKA41-18RR	Monsanto	5.72	-	-	(1)97	2.83	-	3.92	(1)100	3.66	3.16	(1)101
DKA43-22RR	Monsanto	-	5.53	-	(1)100	-	3.05	4.20	(1)104	-	3.12	-
DKA44-16RR	Monsanto	5.99	5.51	5.04	(2)101	2.85	2.98	3.79	(2)103	3.59	3.12	(1)99
Pioneer 54QR04	Pioneer	5.98	-	-	(1)102	2.84	-	-	(1)101	-	-	-
Pioneer VR06	Pioneer	-	5.69	5.55	(1)103	-	-	3.86	-	-	-	-
RR 501	Monsanto	-	5.51	-	(1)99	-	-	-	-	-	3.09	-
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	5.54	5.19		2.82	2.93	3.91		3.63	3.08	

† 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 and 4 times in 2016.

‡ Number of trials with at least 2 years data and % of the mean at each location

Table 8. Long-term average yields (dry matter tons/acre) of perennial forage grasses seeded from 2006 to 2015, and 1-year total from 2015 at East Lansing, Michigan.

Sp †	Variety	Marketer	Three-year average					2-yr avg	1-yr total	% species
			2006	2007	2009	2011	2013	2014	2015	mean ‡‡
----- dry matter tons/acre -----										
FEST	SpringGreen(organic)	Rose Agri-Seed Inc.	-	2.68	-	-	-	-	-	(1) 107
FEST	Becva (PR type)	DLF International Seed	-	-	-	-	-	2.81	-	(1) 102
FEST	Barfest (PR type)	Barenbrug Seed	-	-	-	-	-	2.68	-	(1) 98
FEST	Gain	Allied Seed	-	2.34	-	-	-	-	-	(1) 93
FEST	SPECIES MEAN		-	2.51	-	-	-	2.75	-	
KB	Ginger	check	-	-	3.18	-	-	-	3.15	(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	-	-	-	-	
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	Ambrosia	Amer. Grass Seed Prod	4.13	-	-	-	-	-	-	(1) 97
OR	Barlegro	Barenbrug Seed	-	-	-	-	-	4.21	-	-
OR	Bounty	Standish Milling	4.22	-	-	-	-	-	-	(1) 99
OR	Echelon	DLF International Seed	-	-	-	3.79	-	4.16	-	(2) 100
OR	Elsie	Rose Agri-Seed Inc.	-	3.75	-	-	-	-	-	(1) 94
OR	Extend	Standish Milling	4.46	-	-	-	-	-	-	(1) 105
OR	FSG506OG	Allied Seed	-	-	-	-	-	3.96	-	(1) 98
OR	Harvestar	Columbia Seeds	4.22	-	-	-	-	-	-	(1) 99
OR	Inavale	DLF International Seed	-	-	-	3.79	-	-	-	(1) 98
OR	Intensiv	Barenbrug Seed	-	-	-	3.79	-	4.30	-	(2) 103
OR	Megabite	Rose Agri-Seed Inc.	-	4.09	-	-	-	-	-	(1) 103
OR	Persist	Smith Seed	-	-	3.58	4.12	-	3.84	-	(3) 101
OR	Potomac	check	-	4.15	3.49	3.83	-	3.87	3.29	(4) 99
OR	Warrior II	ProSeeds Marketing	-	3.95	-	-	-	-	-	(1) 99
OR	SPECIES MEAN		4.26	3.99	3.54	3.86	-	4.06	-	
PR	Albion (4n) ††	Cisco Seed	-	-	-	-	-	-	2.24	-
PR	BarSprinter (2n)	Barenbrug Seed	-	2.08	-	-	-	-	-	(1) 94
PR	BG34 (blend)	Barenbrug Seed	-	1.87	-	-	-	-	-	(1) 85
PR	Boost (2n)	Standish Milling	2.94	-	-	-	-	-	-	(1) 103
PR	Calibra (4n)	check	-	-	1.92	-	-	-	-	(1) 102
PR	Elena (4n)	Allied Seed	-	-	-	-	2.25	-	-	(1) 136
PR	Eurostar (2n)	Seed Research of OR	2.83	-	-	-	-	-	-	(1) 99
PR	Fennema (2n)	Amer. Grass Seed Prod	-	-	-	2.21	-	-	-	(1) 87
PR	Kentaur (4n)	DLF International Seed	-	-	-	2.72	-	-	-	(1) 108
PR	Korok (4n)	Czech Republic	-	2.12	-	-	-	-	-	(1) 96
PR	Linn (2n)	check	-	-	1.84	2.39	1.07	2.85	2.41	(4) 87
PR	Mathilda (4n)	DLF International Seed	-	-	-	2.50	-	-	-	(1) 99
PR	Mara (2n)	Barenbrug Seed	-	-	-	-	-	3.11	-	(1) 97
PR	Maximo (4n)	DLF International Seed	-	-	-	-	-	3.33	-	(1) 104
PR	Quartermaster (4n)	Lewis Seed	3.05	-	-	-	-	-	-	(1) 107
PR	Payday (4n)	Smith Seed	-	-	-	-	-	3.37	-	(1) 106
PR	Remington (4n)	Barenbrug Seed	-	2.78	-	2.81	-	3.28	-	(3) 113
PR	Verano (4n)	Columbia Seeds	2.59	-	-	-	-	-	-	(1) 91
PR	SPECIES MEAN		2.85	2.21	1.88	2.53	1.66	3.19	2.33	
RC	Chiefton	check	3.61	-	-	-	-	-	-	(1) 96
RC	Marathon	Standish Milling	3.89	-	-	-	-	-	-	(1) 104
RC	SPECIES MEAN		3.75	-	-	-	-	-	-	
SB	Lincoln	Check variety	-	-	-	-	-	4.01	3.05	(1) 104
SB	Hakari (Alaska Brome)	Barenbrug Seed	-	-	-	-	-	3.70	-	(1) 96
SB	MBA	DLF International Seed	-	-	-	-	-	3.90	-	(1)101
SB	SPECIES MEAN		-	-	-	-	-	3.87	-	

Table 8. Continued next page

Table 8. Continued

			Three-year average					2-yr avg	1-yr total	% species
Sp †	Variety	Marketer	2006	2007	2009	2011	2013	2014	2015	mean ‡‡
----- dry matter tons/acre -----										
TF	BarElite	Barenbrug Seed	-	4.15	-	-	-	4.39	-	(2) 95
TF	Bariane	Barenbrug Seed	-	-	-	-	-	3.97	3.32	(1) 90
TF	Dominate	Allied Seed	-	-	-	-	-	4.61	-	(1) 104
TF	Cajun II	Smith Seed	-	-	-	-	-	4.31	-	(1) 98
TF	Cowgirl	Rose Agri-Seed Inc.	-	4.84	-	-	-	-	-	(1) 107
TF	Enhance	Standish Milling	4.31	-	-	-	-	-	-	(1) 105
TF	Fawn	Seed Research of OR	4.10	-	-	-	-	-	-	(1) 100
TF	Flourish	Allied Seed	-	-	-	-	3.38	-	-	(1) 88
TF	FSG402TF	Allied Seed	-	-	-	-	-	4.43	-	(1) 100
TF	Goliath	Cisco Seed	-	-	4.06	-	-	-	-	(1) 101
TF	Hymark	Fraser Seeds	-	-	-	4.42	-	-	-	(1) 99
TF	Ky31 E plus	check	-	-	3.96	4.75	-	-	3.45	(2) 102
TF	Ky 31 E minus	check	-	-	-	-	3.45	4.39	3.43	(2) 95
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	Tower	DLF International Seed	-	-	-	-	-	4.85	-	(1) 110
TF	Verdant	Amer. Grass Seed Prod	3.87	-	-	-	-	-	-	(1) 94
TF	SPECIES MEAN		4.09	4.54	4.01	4.48	3.83	4.42	3.40	
MdF	Cosmonaut	Barenbrug Seed	-	-	-	-	-	3.61	-	(1) 98
MdF	Pradel	Barenbrug Seed	-	-	3.15	-	-	3.72	2.38	(2) 104
MdF	Preval	Ampac Seed Company	-	-	2.78	-	-	-	-	(1) 94
MdF	SPECIES MEAN		-	-	2.97	-	-	3.67	-	
TM	BarPenta	Barenbrug Seed	-	3.94	-	-	-	-	-	(1) 101
TM	Climax	check	4.03	3.84	-	-	-	3.40	2.85	(3) 94
TM	Crest	Allied Seed	4.94	-	-	-	-	-	-	(1) 107
TM	Express II	Allied Seed	-	-	-	-	-	3.79	-	(1) 105
TM	Summit	Allied Seed	4.87	-	-	-	-	-	-	(1) 106
TM	SPECIES MEAN		4.61	3.89	-	-	-	3.60		

† FEST=Festulolium, KB=Kentucky bluegrass, MB=Meadow Bromegrass, SB=Smooth Bromegrass, OR=Orchardgrass,

PR=Perennial ryegrass, RC=Reed canarygrass, TF= Tall fescue, MdF= Meadow fescue, TM=Timothy

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



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.

			Lake City ‡			Chatham ‡	
			3-year average	2-year average	1- year total	2-year average	1-year total
Sp †	Variety	Marketer	2006	2014	2015	2014	2015
----- Dry matter tons/acre -----							
OR	Ambrosia	Amer. Grass Seed Prod	3.36	-	-	-	-
OR	Bounty	Standish Milling	3.61	-	-	-	-
OR	Echelon	DLF International Seed	-	3.16	-	1.52	-
OR	Extend	Standish Milling	3.37	-	-	-	-
OR	Harvestar	Columbia Seeds	3.18	-	-	-	-
OR	Intensiv	Barenbrug Seed	-	3.40	5.36	1.67	-
OR	Persist	Smith Seed	-	3.06	4.60	1.54	-
OR	Potomac	check variety	-	3.01	4.53	1.61	2.49
OR	SPECIES MEAN		3.38	3.16	4.83	1.59	-
PR	Albion (4n)	Cisco Seeds	-	-	4.88	-	0.93
PR	Eurostar (2n)	Seed Research of OR	2.05	-	-	-	-
PR	Linn (2n)	check variety	-	-	-	-	1.56
PR	Mara (2n)	Barenbrug Seed	-	-	4.26	-	1.27
PR	Payday (4n)	Smith Seed	-	-	4.69	-	-
PR	Remington (4n)	Barenbrug Seed	-	-	-	-	1.15
PR	Verano (4n)	Columbia Seeds	2.01	-	-	-	-
PR	SPECIES MEAN		2.03	-	4.61	-	1.23
RC	Chiefton	check variety	2.25	-	-	-	-
RC	Marathon	Standish Milling	2.76	-	-	-	-
RC	SPECIES MEAN		2.51	-	-	-	-
TF	Bariane	Barenbrug Seed	-	2.94	5.68	1.75	1.99
TF	Enhance	Standish Milling	2.44	-	-	-	-
TF	Kentucky 31 Plus	check variety	-	3.22	5.23	2.17	2.52
TF	Kentucky 31 minus	check variety	-	3.24	5.52	2.07	-
TF	Kentucky 32	check variety	-	-	-	-	2.68
TF	Tuscany II	Forage First	-	3.31	5.34	2.25	-
TF	Verdant	Amer. Grass Seed Prod	2.44	-	-	-	-
TF	SPECIES MEAN		2.44	3.18	5.44	2.06	2.40
TM	BarPenta	Barenbrug Seed	-	3.14	-	2.27	-
TM	Climax	check variety	2.14	2.98	5.42	2.34	1.53
TM	Crest	Allied Seed	2.44	3.71	-	2.48	-
TM	Summit	Allied Seed	2.55	3.53	5.51	2.65	-
TM	Winnetow	DLF International Seed	-	-	-	-	1.02
TM	Zenyatta	DLF International Seed	-	-	5.76	-	1.67
TM	SPECIES MEAN		2.38	3.34	5.56	2.44	1.41
KB ††	Ginger	check variety	-	-	1.64	-	0.98
SB ††	Lincoln	check variety	-	-	5.52	-	1.59
MdF ††	Pradel	Barenbrug Seed	-	-	4.93	-	2.60

† KB=Kentucky bluegrass, SB=Smooth Bromegrass, OR=Orchardgrass, PR=Perennial ryegrass, RC=Reed canarygrass, TF= Tall fescue, MdF= Meadow fescue, TM=Timothy

†† Only one commercially available variety of Kentucky Bluegrass, Smooth Bromegrass, and Meadow Fescue.

‡ Generally 3 cuttings per year at Lake City. Two cuttings per year at Chatham for Orchardgrass, Tall fescue, Bromegrass and 1 cutting per year for Perennial Ryegrass and Timothy.

Table 10. Michigan State University Grass Maturity Dates in First Cutting of 2016 in the Perennial Grass Variety Trials at East Lansing, Lake City and Chatham.

Fescue - Tall, Meadow, Festulolium							
Variety	Trial Seeding Years						
	2013	2014			2015		
	East Lansing	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham
AGRFA 179 †	June 1	-	-	-	-	-	-
AGRFA 200 †	May 31	-	-	-	-	-	-
BAR FA 13131 †	-	-	-	-	-	June 15	-
BAR FAFL 118701 †	-	May 28	-	-	-	-	-
BarElite	-	May 30	-	-	-	-	-
Barfest (Fest)	-	June 3	-	-	-	-	-
Bariane	-	June 3	June 17	Veg	June 5	June 17	Veg
BAR FPF 32 (Meadow) †	-	-	-	-	-	June 11	-
Becva (Fest)	-	June 1	-	-	-	-	-
Cajun II	-	May 22	-	-	-	-	-
Cosmonaut (Meadow)	-	May 27	-	-	-	-	-
Dominate	-	May 22	-	-	-	-	-
Flourish	May 26	-	-	-	-	-	-
FSG 402TF ++	-	May 25	-	-	-	-	-
GT 213 †	May 27	-	-	-	-	-	-
Kentucky 31 Minus	May 22	May 24	June 10	June 14	May 24	June 10	-
Kentucky 31 Plus	-	-	June 10	June 15	May 26	June 11	June 13
Kentucky 32	-	-	-	-	-	-	June 13
MT 9301 †	-	May 29	-	-	-	-	-
Pradel (Meadow)	-	May 29	-	-	May 31	June 13	June 10
TF0705SL †	-	May 24	-	-	-	-	-
Tower	-	May 30	-	-	-	-	-
Tuscany II	-	-	June 10	June 15	-	June 10	-
Harvest Dates	June 10	June 9	June 18	June 17	June 6	June 18	June 15
Perennial Ryegrass							
Variety	Trial Seeding Years						
	2013	2014			2015		
	East Lansing	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham
AGRLP-156 †	-	May 29	-	-	-	-	-
AGRLP-157 †	-	June 7	-	-	-	-	-
Albion	-	-	-	-	Veg	Veg	Veg
DLFPS-LHT7 †	-	June 1	-	-	-	-	-
Elena	June 1	-	-	-	-	-	-
Linn	-	May 24	-	-	May 26	-	June 6
Mara	-	June 4	-	-	-	Veg	Veg
Maximo (Int)	-	May 29	-	-	-	-	-
Payday	-	June 3	-	-	-	Veg	-
RAD-MRF 145 †	June 1	-	-	-	-	-	-
Remington	-	June 9	-	-	-	-	Veg
Harvest Dates	June 10	June 9	-	-	June 6	June 18	June 14
Orchardgrass							
Variety	Trial Seeding Years						
	2014			2015			
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham	
Barlegro	June 5	-	-	-	-	-	-
Echelon	May 29	June 6	June 15	-	-	-	-
FSG 506OG ++	May 20	-	-	-	-	-	-
GO-BXCR †	-	-	-	May 25	June 8	June 8	-
GO-MOSO †	-	-	-	May 23	June 7	June 3	-
Intensiv	June 2	June 9	June 16	-	June 12	-	-
OG 0707 †	-	-	-	May 22	-	-	-
OG0604WH †	May 24	-	-	-	-	-	-
Persist	May 19	June 2	June 6	-	June 2	-	-
Potomac	May 19	June 2	June 8	May 23	June 2	June 5	-
Harvest Dates	June 6	June 18	June 17	June 6	June 18	June 15	

Table 10. Continued next page

Table 10. Continued

Timothy

Trial Seeding Years

Variety	2014			2015		
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham
Climax	Veg	Veg	Veg	Veg	Veg	Veg
Express II ††	June 9	-	-	-	-	-
GO-120X †	-	-	-	June 4	Veg	Veg
TM0801 †	May 28	-	-	-	-	-
Barpenta	-	Veg	Veg	-	-	-
Crest	-	June 13	June 17	-	-	-
Summit	-	June 10	June 15	-	June 13	-
Winnetow	-	-	-	-	-	Veg
Zenyatta	-	-	-	-	June 14	June 15
Harvest Dates	June 9	June 18	June 17	June 6	June 18	June 17

Bromegrass -

Smooth, Meadow, Alaska

Trial Seeding Years

Variety	2014			2015		
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham
BAR BcF 1FFRL (MB) †	May 17	-	-	-	-	-
BAR BiF 1GRL †	May 26	-	-	-	-	-
GO-SBF †	-	-	-	May 28	June 2	June 6
Hakari (Alaska)	June 4	-	-	-	-	-
Lincoln	May 26	-	-	Veg	June 5	June 12
MBA	May 18	-	-	-	-	-
Harvest Dates	June 9	-	-	June 6	June 18	June 14

Kentucky Bluegrass

Trial Seeding Years

Variety	2014			2015		
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham
Ginger	-	-	-	May 17	June 2	June 1
GO-13NF †	-	-	-	May 20	June 2	June 2
Harvest Dates	-	-	-	June 6	June 18	June 14

† Experimental variety, not commercially available at this time

†† Variety entered as an experimental that is now commercially available

Veg - Varieties still in the vegetative stage on the date of first cutting



Table 11. 2016 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa variety Trial seeded in East Lansing, Michigan in August 2013

Variety	2016 - Four cuts and Total					2015	2014	Trial
	June 7	July 6	August 9	Sept 27	Total	Total	Total	Total
PGI 529 ††	2.71	1.05	1.04	1.40	6.21*	7.33*	6.43	19.97*
Pioneer 55V50	2.53	0.85	0.91	1.41	5.68*	7.20*	6.88*	19.76*
DSD03-T †	2.38	1.04	1.26	1.54	6.22*	6.80	6.70*	19.72*
HybriForce-3400 ††	2.35	0.83	0.97	1.49	5.64*	6.88	6.78*	19.29*
Pioneer 55Q27	2.44	1.01	1.07	1.38	5.90*	6.74	6.51*	19.16*
FSG 424	2.50	1.03	1.09	1.37	6.00*	6.72	6.17	18.89*
LS905 †	2.39	1.03	1.15	1.33	5.89*	6.64	6.29	18.82*
DSD07-M †	2.40	0.87	0.99	1.43	5.68*	6.82	6.20	18.69
LegenDairy XHD	2.46	0.99	1.06	1.34	5.84*	6.57	6.20	18.60
DG4210	2.48	1.08	1.11	1.25	5.92*	6.64	5.93	18.48
6585Q	2.32	1.00	1.06	1.35	5.73*	6.59	6.06	18.37
LS804 †	2.30	0.90	0.97	1.28	5.45*	6.41	6.28	18.15
FSG 403LR	2.22	0.71	0.82	1.34	5.10	6.55	6.46*	18.10
L455HD	2.25	0.89	0.96	1.24	5.34	6.30	6.30	17.94
Pioneer 54QR04	2.22	0.85	0.90	1.28	5.25	6.44	6.16	17.85
LS803 †	2.16	0.87	0.94	1.28	5.25	6.20	6.19	17.65
Oneida VR	1.94	0.72	0.83	1.35	4.84	5.44	6.32	16.59
Vernal	1.96	0.62	0.63	1.16	4.36	5.42	5.92	15.70
Average	2.33	0.91	0.99	1.35	5.57	6.54	6.32	18.43
LSD 0.05	0.54	0.24	0.36	0.12	0.77	0.36	0.43	1.25
CV %	6.9	18.8	25.4	6.1	9.7	3.9	4.8	4.8

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

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

Table 12. 2016 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial seeded in East Lansing, Michigan in July 2013.

Variety	2016 Four cuts and Total					2015	2014	Seeding	Trial
	June 7	July 6	Aug 10	Sept 27	Total	Total	Total	year	Total
428RR	2.50	0.70	0.97	1.19	5.37*	6.24*	6.42	0.68*	18.71
Pioneer 54QR04	2.56	0.61	0.93	1.19	5.28*	6.19*	6.47	0.67*	18.61
DKA44-16RR	2.51	0.57	0.91	1.16	5.15*	6.28*	6.53	0.63	18.60
RR Stratica	2.57	0.57	0.88	1.22	5.24*	6.14*	6.48	0.68*	18.54
WL 356HQ.RR	2.47	0.59	0.90	1.16	5.12*	6.26*	6.49	0.68*	18.53
6497R	2.41	0.64	0.90	1.17	5.12*	6.23*	6.46	0.70*	18.51
WL372HQ.RR	2.50	0.60	0.95	1.16	5.21*	6.05*	6.38	0.72*	18.35
AmeriStand 455TQ RR	2.40	0.58	0.91	1.16	5.05*	6.16*	6.22	0.63	18.06
DKA41-18RR	2.44	0.53	0.90	1.12	4.99	5.76	6.40	0.66	17.80
Yieldmaster RR	2.44	0.51	0.84	1.15	4.95	5.81	6.33	0.67*	17.75
Average	2.48	0.59	0.91	1.17	5.15	6.11	6.42	0.67	18.35
LSD 0.05	0.20	0.06	0.09	0.09	0.37	0.42	0.36 ns	0.05	1.02 ns
CV %	5.6	8.0	7.0	5.6	4.9	4.8	3.8	5.1	3.8

* 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 13. 2016 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial seeded in Lake City, Michigan in July 2013.

Variety	2016 Three cuts and Total				2015	2014	3-year
	June 17	July 19	Sept 20	Total	Total	Total	Total
L455HD	1.28	0.56	0.19	2.02	2.87	3.41	8.30
Pioneer 55V50	1.19	0.49	0.21	1.89	2.88	3.42	8.19
LS804 †	1.29	0.50	0.20	2.00	2.76	3.42	8.17
Oneida VR	1.20	0.44	0.21	1.85	2.68	3.31	7.83
Pioneer 55Q27	1.18	0.50	0.17	1.85	2.69	3.24	7.78
DG4210	1.23	0.53	0.18	1.94	2.68	3.12	7.74
Pioneer 54QR04	1.17	0.52	0.19	1.88	2.63	3.17	7.68
Vernal	1.14	0.43	0.18	1.75	2.64	3.27	7.65
Average	1.21	0.50	0.19	1.90	2.73	3.30	7.92
LSD 0.05	0.31	0.11	0.08	0.40 ns	0.60 ns	0.45 ns	1.28 ns
CV %	17.8	15.6	26.3	14.4	15.1	9.4	11.0

† Experimental Variety

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

Table 14. 2016 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial seeded in Lake City, Michigan in July 2013.

Variety	2016 Three cuts and Total				2015	2014	3-year
	June 17	July 19	Sept 20	Total	Total	Total	Total
DKA44-16RR	1.37	0.64	0.17	2.17	3.01	3.38	8.56
Pioneer 54QR04	1.23	0.60	0.19	2.02	2.98	3.51	8.51
DKA41-18RR	1.22	0.62	0.20	2.04	2.94	3.51	8.49
Yieldmaster RR	1.24	0.61	0.19	2.03	2.87	3.35	8.24
Average	1.27	0.62	0.19	2.07	2.95	3.44	8.45
LSD 0.05	0.22	0.07	0.09	0.32 ns	0.29 ns	0.26 ns	0.66 ns
CV %	11.0	7.0	28.6	9.6	6.3	4.7	4.9

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

Table 15. 2016 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial seeded in Chatham, Michigan in July 2013.

Variety	2016 Three cuts and Total				2015	2014	3 -year
	June 20	July 28	Sept 21	Total	Total	Total	Total
DG 4210	2.14	0.88	0.30	3.32*	3.74*	4.15	11.21
Pioneer 55V50	2.20	0.91	0.28	3.39*	3.66*	3.92	10.98
Vernal	1.95	0.87	0.27	3.08	3.34	4.18	10.60
Pioneer 5312	2.07	0.86	0.25	3.18*	3.32	4.08	10.57
Average	2.09	0.88	0.27	3.24	3.52	4.08	10.84
LSD 0.05	0.16	0.09	0.05	0.24	0.24	0.52 ns	0.76 ns
CV %	4.9	6.5	11.9	4.7	4.2	8.0	4.4

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

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

Table 16. 2016 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial seeded in Chatham, Michigan in July 2013.

Variety	2016 Three cuts and Total				2015	2014	3-year
	June 20	July 28	Sept 21	Total	Total	Total	Total
DKA 41-18RR	2.00	0.85	0.28	3.13	3.64	4.21	10.98
Yieldmaster RR	1.94	0.83	0.30	3.06	3.67	4.19	10.92
DKA 44-16RR	1.99	0.85	0.28	3.13	3.72	3.93	10.78
Average	1.98	0.84	0.29	3.11	3.68	4.11	10.89
LSD 0.05	0.30	0.11	0.05	0.29 ns	0.12 ns	0.63 ns	0.58 ns
CV %	8.8	7.0	10.1	5.5	1.9	8.9	3.1

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

Table 17. 2016 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa variety Trial seeded in East Lansing, Michigan in May 2014

Variety	2016 - Four cuts and Total				2015	Two-year
	June 9	July 12	Aug10	Oct 6	3-cut Total	Total
Pioneer 55Q27	3.37	1.59	1.75	1.03	7.75*	13.36*
StarGold ††	3.07	1.68	1.93	1.01	7.68*	13.03*
AFXH 134089 †	3.08	1.47	1.59	1.10	7.24*	13.02*
Fierce	3.20	1.43	1.63	1.00	7.25*	12.77*
Contender	3.02	1.41	1.62	0.98	7.02	12.64*
Caliber	2.94	1.47	1.63	0.95	6.99	12.64*
GA 409	3.11	1.48	1.68	1.02	7.30*	12.54*
Prolific II	2.96	1.28	1.44	1.05	6.73	12.50*
HybriPro BR	3.16	1.31	1.49	1.06	7.01	12.50*
Enduro Elite	3.01	1.46	1.57	0.91	6.96	12.37
Pioneer 54Q14	2.85	1.34	1.51	0.95	6.66	12.21
Oneida VR	2.79	1.22	1.33	1.05	6.39	11.76
Vernal	2.83	1.18	1.40	1.03	6.44	11.48
Average	3.02	1.39	1.57	1.01	6.99	12.45
LSD 0.05	0.31	0.15	0.15	0.14	0.6	0.89
CV %	6.1	6.6	5.7	8.4	5.1	4.3

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

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

Table 18. 2016 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial seeded in East Lansing, Michigan in May 2014.

Variety	2016 - Four cuts and Total				2015	Two-year
	June 9	July 12	Aug 10	Oct 6	3-cut Total	Total
Pioneer 55VR06	2.83	1.29	1.45	1.13	6.70	11.38
DKA 43-22RR	2.81	1.22	1.36	1.07	6.46	11.04
DKA 44-16RR	2.73	1.28	1.45	0.99	6.45	11.01
RR 501	2.58	1.33	1.45	1.02	6.39	11.01
DKA 40-51RR	2.88	1.22	1.33	1.02	6.46	10.91
Average	2.77	1.27	1.41	1.05	6.49	11.07
LSD 0.05	0.27	0.18	0.08	0.10	0.47 ns	1.17 ns
CV %	5.2	7.3	3.6	5.2	3.8	5.6

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

Table 19. 2016 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial seeded in Lake City, Michigan in July 2014.

Variety	2016 Three cuts and Total				2015	Two-year
	June 17	July 19	Sept 20	Total	Total	Total
L455HD	2.27	0.99	0.34	3.60*	3.92	7.52
Mariner IV	2.20	0.89	0.38	3.46*	3.95	7.42
Prolific II	2.10	0.85	0.38	3.33*	4.09	7.42
Pioneer 55V50	2.05	0.87	0.41	3.33*	4.09	7.42
Pioneer 55Q27	2.09	0.94	0.37	3.41*	3.81	7.22
Oneida VR	1.97	0.80	0.40	3.17*	3.99	7.16
Magnum 7 Wet	2.00	0.78	0.37	3.14*	3.96	7.11
HybriForce 3400	1.86	0.76	0.39	3.02*	3.93	6.95
Vernal	1.79	0.78	0.39	2.96*	3.91	6.87
StarGold ++	1.90	0.83	0.32	3.05*	3.60	6.65
Octane ++	1.85	0.79	0.32	2.96*	3.68	6.64
Hi-Gest 360 ++	1.80	0.81	0.30	2.90*	3.53	6.43
DG 4210	1.78	0.77	0.31	2.87*	3.45	6.32
Ameristand 403T Plus	1.68	0.67	0.28	2.63*	3.51	6.14
Pioneer 54Q14	1.74	0.74	0.25	2.72*	3.35	6.07
WL 354HQ	1.54	0.62	0.27	2.43	3.53	5.96
Average	1.91	0.81	0.34	3.06	3.77	6.83
LSD 0.05	0.64	0.31	0.15	1.06	0.98 ns	1.72 ns
CV %	23.7	25.6	30.8	24.2	18.3	17.6

++ 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. 2016 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial seeded in Lake City, Michigan in July 2014.

Variety	2016 Three-cuts and Total				2015	Two-year
	June 17	July 19	Sept 20	Total	Total	Total
DKA43-22RR	1.77	0.73	0.29	2.78	3.32	6.10
DKA44-16RR	1.78	0.71	0.24	2.73	3.23	5.96
DKA40-51RR	1.59	0.67	0.25	2.51	3.00	5.52
Average	1.71	0.70	0.26	2.67	3.18	5.86
LSD 0.05	0.30	0.20	0.11	0.56 ns	0.67 ns	1.50 ns
CV %	8.4	12.5	12.7	9.3	12.2	14.8

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

Table 21. 2016 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa variety Trial seeded in East Lansing, Michigan in May 2015

Variety	2016 Four cuts and Total				
	June 4	July 12	August 9	October 4	Total
FSG415BR	2.56	1.08	0.92	1.27	5.83*
msSunstra-144142 †	2.64	0.87	0.84	1.35	5.69*
msSunstra-144131 †	2.54	0.85	0.83	1.34	5.56*
Fierce	2.45	0.91	0.87	1.21	5.45*
msSunstra-144110 †	2.50	0.78	0.86	1.29	5.43*
msSunstra-145159 †	2.51	0.76	0.80	1.35	5.41*
msSunstra-145154 †	2.50	0.80	0.82	1.28	5.40*
FF42.A2	2.29	0.94	0.95	1.10	5.28
Pioneer 55Q27	2.30	0.85	0.88	1.18	5.20
HybriForce 3400	2.47	0.66	0.73	1.30	5.16
Contender	2.35	0.74	0.78	1.20	5.06
FSG426	2.16	0.83	0.84	1.10	4.93
CW 054004 †	2.10	0.75	0.78	1.08	4.71
Caliber	2.07	0.63	0.69	1.12	4.51
Vernal	2.15	0.61	0.63	1.03	4.42
Average (15 entries)	2.37	0.80	0.81	1.21	5.20
LSD 0.05	0.23	0.22	0.13	0.10	0.53
CV %	8.6	23.3	13.4	7.0	5.7
† Experimental Variety					
* Yield is not statistically different from the greatest value in the column.					

Table 22. 2016 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial seeded in East Lansing, Michigan in May 2015.

Variety	2016 Four cuts and Total				
	June 4	July 12	August 9	October 4	Total
Pioneer 55VR06	2.49	1.05	0.84	1.17	5.55*
DKA 40-51RR	2.42	0.97	0.86	1.10	5.35*
DKA 44-16RR	2.36	0.88	0.76	1.04	5.04*
43ORRLH	2.24	0.86	0.69	1.02	4.81
Average	2.38	0.94	0.79	1.08	5.19
LSD 0.05	0.24	0.29	0.13	0.08	0.65
CV %	8.1	25.0	13.3	5.8	10.1
* Yield is not statistically different from the greatest value in the column.					

Table 23. 2016 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial seeded in Lake City, Michigan in July 2015.

Variety	2016 Three cuts and Total			
	June 21	July 25	Sept 21	Total
Hybriforce 3400	2.85	1.27	0.87	4.99*
Oneida VR	2.71	1.25	0.88	4.85*
Pioneer 55V50	2.75	1.25	0.81	4.82*
Prolific II	2.51	1.27	0.89	4.67*
Mariner IV	2.59	1.22	0.81	4.62*
Magnum 7 Wet	2.60	1.23	0.77	4.59*
Vernal	2.64	1.13	0.75	4.52*
Ameristand 403T Plus	2.47	1.22	0.81	4.50*
DG4210	2.48	1.23	0.75	4.46*
Pioneer 55Q27	2.52	1.17	0.72	4.41
L455HD	2.48	1.18	0.69	4.35
Pioneer 54Q14	2.47	1.11	0.71	4.29
Average	2.59	1.21	0.79	4.59
LSD 0.05	0.25	0.23	0.14	0.54
CV %	6.8	13.2	12.6	8.2

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

Table 25. 2016 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial seeded in Chatham, Michigan in August 2015.

Variety	2016 Three cuts and Total			
	June 20	July 28	Sept 21	Total
Hybriforce 3400	1.86	1.12	0.31	3.29*
Pioneer 55Q27	1.76	1.09	0.33	3.18*
L455 HD	1.76	1.04	0.31	3.11*
Prolific II	1.82	0.97	0.3	3.09*
StarGold ††	1.63	1.08	0.35	3.06*
DG 4210	1.65	1.06	0.31	3.02*
Magnum 7 Wet	1.76	0.95	0.27	2.97*
Ameristand 403T Plus	1.68	0.96	0.28	2.91
WL 354HQ	1.66	0.94	0.26	2.86
Mariner IV	1.77	0.84	0.24	2.85
Oneida VR	1.71	0.86	0.28	2.85
Vernal	1.66	0.85	0.26	2.77
Average	1.73	0.98	0.29	3.00
LSD 0.05	0.21	0.18	0.06	0.36
CV %	8.3	12.5	16.8	8.3

†† Released variety seeded as an experimental.

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

Table 24. 2016 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial seeded in Lake City, Michigan in July 2015.

Variety	2016 Threecuts and Total			
	June 21	July 25	Sept 21	Total
DKA 43-22RR	2.46	1.12	0.62	4.20
DKA 41-18RR	2.32	1.04	0.56	3.92
Pioneer 55VR06	2.28	1.05	0.54	3.86
DKA 44-16RR	2.17	1.07	0.56	3.79
DKA 40-51RR	2.30	0.98	0.49	3.77
Average	2.31	1.05	0.55	3.91
LSD 0.05	0.30	0.20	0.11	0.56 ns
CV %	8.4	12.5	12.7	9.3

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

Table 26. 2016 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial seeded in Chatham, Michigan in August 2015.

Variety	2016 Three cuts and Total			
	June 20	July 28	Sept 21	Total
DKA 41-18 RR	1.88	1.01	0.28	3.16
DKA 43-22 RR	1.79	1.05	0.28	3.12
DKA 44-16 RR	1.88	0.98	0.25	3.12
RR-501	1.85	0.99	0.25	3.09
DKA 40-51 RR	1.77	0.92	0.22	2.91
Average	1.83	0.99	0.26	3.08
LSD 0.05	0.19	0.27	0.05	0.32 ns
CV %	7.0	17.9	14.1	6.8

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

Table 27. 2016 Seeding-year Yields (DM tons/acre) of the MSU Conventional Alfalfa variety Trial seeded in East Lansing, Michigan in May 2016

Variety	2016 Seeding Year - Two cuts and Total		
	August 4	October 4	Total
msSunstra-143147 †	0.96	1.24	2.19*
msSunstra-144110 †	0.95	1.19	2.15*
msSunstra-143146 †	0.92	1.21	2.13*
8450	1.05	1.07	2.12*
msSunstra-144109-OB2 †	0.88	1.22	2.09*
LS1401 †	0.84	1.16	2.00
msSunstra-144109 †	0.84	1.13	1.98
KF-406-A2	0.87	1.10	1.97
Vernal	0.85	1.12	1.96
msSunstra-144109-OB1 †	0.82	1.11	1.94
8420	0.89	1.03	1.93
Pioneer 55Q27	0.85	1.08	1.93
SW1412Y †	0.79	1.09	1.88
LS1302 †	0.81	1.05	1.86
Fortune	0.77	1.09	1.86
Stalwart II	0.78	1.08	1.86
SW1314Y †	0.77	1.07	1.84
Oneida VR	0.71	1.12	1.84
KFG-425HD	0.82	0.97	1.79
SW5210 †	0.77	1.02	1.79
Rebound 6XT	0.83	0.95	1.78
GA-497HD	0.74	1.03	1.77
SW5213 †	0.70	1.01	1.72
WL365HQ	0.68	0.91	1.58
Average	0.83	1.09	1.92
LSD 0.05	0.13	0.08	0.17
CV %	11.4	5.4	6.3

† Experimental Variety

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

Table 28. 2016 Seeding-year Yields (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial seeded in East Lansing, Michigan in May 2016.

Variety	2016 Seeding Year - Two cuts and Total		
	August 4	October 4	Total
Pioneer 55VR08	0.63	1.00	1.63
8444R	0.66	0.95	1.61
9200RR	0.64	0.94	1.58
DKA44-16RR	0.62	0.93	1.55
RR AphaTron 2XT	0.60	0.94	1.54
DKA40-51RR	0.58	0.96	1.54
Average	0.62	0.95	1.58
LSD 0.05	0.07	0.07	0.11 ns
CV %	7.3	5.1	4.3
ns - Total yield among varieties in this column			



Table 29. 2016 DM yields (DM tons/acre) of the MSU Perennial Grass Trials seeded in East Lansing, Michigan in May 2013

Tall Fescue		2016 yields, Three-cuts and Total				2015 Total	2014 Total	2013 Seeding yr	Trial Total
	2016 Heading Date ‡	Cut 1 June 10	Cut 2 July 14	Cut 3 Oct 18	2016 Total				
AGRFA 179 †	June 1	1.01	0.36	1.31	2.69	3.51*	4.75	1.00	11.96
AGRFA 200 †	May 31	0.97	0.34	1.21	2.52	3.43*	4.70	1.03	11.68
GT 213 †	May 27	1.05	0.43	1.26	2.75	3.27	4.68	0.97	11.67
Kentucky 31 minus	May 22	1.12	0.40	1.06	2.57	3.29	4.49	0.95	11.32
Flourish	May 26	1.18	0.38	1.08	2.64	3.08	4.42	1.02	11.16
Mean		1.07	0.38	1.19	2.64	3.32	4.61	0.99	11.56
LSD 0.05		0.15	0.11	0.15	0.26 ns	0.23	0.36 ns	0.23 ns	0.80 ns
CV %		8.9	18.7	8.0	6.4	4.5	5.0	14.8	4.5
Perennial Ryegrass		2016 yields, Two-cuts and Total				2015 Total	2014 Total	2013 Seeding yr	Trial Total
	2016 Heading Date ‡	Cut 1 June 10		Cut 2 Oct 18	2016 Total				
Elena	June 1	1.09		0.47	1.56	1.63*	3.55*	0.62	7.35
RAD-MRF145 †	June 1	1.17		0.47	1.63	1.57*	3.34*	0.53	7.06
Linn (Check)	No yield in 2016 - Winterkill in 2015/2016					1.02	2.20	0.37	NA
Mean		1.13		0.47	1.60	1.40	3.03	0.51	7.21
LSD 0.05		0.14		0.14	0.26 ns	0.42	0.54	0.20	1.39 ns
CV %		5.5		13.2	7.2	17.1	10.3	22.5	8.6
† Experimental Variety									
* Yield is not statistically different from the greatest value in the column.									
ns - Total yield among varieties 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 30. 2016 DM yields (DM tons/acre) of the MSU Perennial Ryegrass and Bromegrass Variety Trials seeded in East Lansing, Michigan in May 2014

Perennial Ryegrass		2016 Heading Date ‡	2016 yields, Three-cuts and Total				2015 Total	Two-year Total
			June 9	Aug 5	Oct 19	Total		
DLFPS-LHT7 †	Hybrid (4n)	June 1	2.12	0.72	0.73	3.56*	3.70*	7.26*
Payday	Perennial (4n)	June 3	1.69	0.72	0.75	3.15	3.59*	6.74*
Maximo	Intermediate Hybrid	May 29	2.22	0.78	0.60	3.59*	3.07	6.66
AGRLP-157 †	Perennial (2n)	June 7	1.46	0.84	0.97	3.26*	3.28	6.55
Remington	Perennial (4n)	June 9	1.69	0.73	1.03	3.45*	3.10	6.55
AGRLP-156 †	Perennial (2n)	May 29	1.63	0.94	0.89	3.47*	3.00	6.47
Mara	Perennial (2n)	June 4	1.50	0.90	0.81	3.21	3.01	6.22
Linn	Perennial	May 24	1.60	0.75	0.59	2.94	2.76	5.69
Mean			1.74	0.80	0.79	3.33	3.19	6.52
LSD 0.05			0.24	0.19	0.08	0.33	0.41	0.59
CV %			9.2	16.2	7.4	6.8	8.7	6.2

Comments: Maximo and DLFPS-LHT7 were headed on the date of second cutting

Bromegrass		2016 Heading Date ‡	2016 yields, Three-cuts and Total				2015 Total	Two-year Total
			June 9	Aug 5	Oct 19	Total		
Lincoln	Smooth	May 26	2.07	0.60	0.94	3.61	4.41*	8.02
BAR BiF 1GRL †	Smooth	May 26	2.35	0.60	0.86	3.80	4.17*	7.97
BAR BcF 1FFRL †	Meadow	May 17	2.07	0.71	1.10	3.87	4.00*	7.87
MBA	Smooth	May 18	2.09	0.74	1.13	3.95	3.84*	7.78
Hakari	Alaska	June 4	2.36	0.63	0.86	3.85	3.55	7.40
Mean			2.19	0.65	0.97	3.82	3.99	7.81
LSD 0.05			0.37	0.11	0.21	0.46 ns	0.63	0.94 ns
CV %			10.9	10.5	13.7	7.8	10.2	7.8

Comments: Hakari headed at second cutting

† Experimental Entry

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

ns - Total yield among varieties 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 31. 2016 DM yields (DM tons/acre) of the MSU Fescue (Tall, Meadow, Festulolium) Variety Trial seeded in East Lansing, Michigan in May 2014

Tall Fescue	2016 Heading	2016 yields, Three-cuts and Total				2015	Two-year
	Date ‡	June 9	July 14	Oct 19	Total	Total	Total
Tower	May 30	1.71	0.58	2.08	4.37*	5.32*	9.68*
TF0705SL †	May 24	1.71	0.62	1.94	4.27*	5.16*	9.43*
Dominate	May 22	1.95	0.43	1.91	4.29*	4.92*	9.20*
FSG 402TF ††	May 25	1.76	0.52	1.88	4.17*	4.68*	8.84*
Kentucky 31 minus	May 24	1.71	0.52	1.54	3.77	5.01*	8.78
BarElite	May 30	1.67	0.51	1.97	4.16*	4.59*	8.74
Cajun II	May 22	1.81	0.63	1.70	4.14*	4.48	8.62
MT 9301 †	May 29	1.64	0.48	1.84	3.96	4.62*	8.57
Bar FAFL 118701 †	May 28	1.44	0.50	1.76	3.71	4.77*	8.48
Bariane	June 3	1.29	0.48	1.74	3.51	4.43	7.93
LSD (0.05) Tall Fescue		0.21	0.11	0.19	0.35	0.73	0.87
Meadow Fescue							
Pradel	May 29	1.69	0.40	1.11	3.20	4.23	7.43
Cosmonaut	May 27	1.59	0.37	1.21	3.17	4.04	7.21
LSD (0.05) Meadow Fescue		0.47	0.12	0.23	0.69 ns	1.17 ns	1.78 ns
Festulolium							
Becva	June 1	1.92	0.30	0.79	3.01	2.60	5.61
Barfest	June 3	1.86	0.22	0.88	2.95	2.41	5.36
LSD (0.05) Festulolium		0.50	0.12	0.30	0.73 ns	0.21 ns	0.75 ns
Mean		1.70	0.47	1.60	3.76	4.38	8.14
LSD (0.05) All Varieties		0.23	0.10	0.18	0.37	0.66	0.83
CV %		9.4	15.4	7.9	6.9	10.6	7.2

† Experimental Entry, †† Variety Entered as an Experimental

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

ns - Total yield among varieties 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 32. 2016 DM yields (DM tons/acre) of the MSU Orchardgrass and Timothy Grass Variety Trials Seeded in East Lansing, Michigan in July 2014

Orchardgrass	2016 Heading	2016 yields, Three-cuts and Total				2015	Two-year
	Date ‡	June 6	July 15	Oct 12	Total	Total	Total
Intensiv	June 2	1.37	0.34	1.45	3.16	5.43	8.59
Barlegro	June 5	1.32	0.34	1.43	3.10	5.31	8.40
Echelon	May 29	1.27	0.29	1.48	3.04	5.27	8.31
OG0604WH †	May 21	1.63	0.26	1.40	3.29	4.68	7.97
FSG 506OG ††	May 20	1.54	0.26	1.36	3.16	4.76	7.92
Potomac	May 19	1.45	0.27	1.28	3.01	4.72	7.73
Persist	May 19	1.63	0.25	1.37	3.25	4.43	7.68
Mean		1.46	0.29	1.40	3.14	4.95	8.09
LSD 0.05		0.53	0.07	0.23	0.76 ns	1.00 ns	1.68 ns
CV %		24.6	14.8	11.0	16.3	13.7	14.0

Timothy	2016 Heading	2016 yields, Three-cuts and Total				2015	Two-year
	Date ‡	June 9	Aug 5	Oct 19	Total	Total	Total
TM0801 †	May 28	3.53	0.31	0.71	4.54*	5.23*	9.78*
Express II ††	June 9	2.43	0.26	0.55	3.23	4.34	7.58
Climax	Vegetative	2.23	0.20	0.55	2.99	3.81	6.80
Mean		2.73	0.26	0.60	3.59	4.46	8.05
LSD 0.05		0.52	0.09	0.12	0.59	0.18	0.69
CV %		11.0	22.8	12.2	9.6	2.3	5.0

Comments: Estimate heading date of Climax at first cutting would have been June 11.

† Experimental Entry, †† Variety Entered as an Experimental

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

ns - Total yield among varieties 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 33. 2016 DM yields (DM tons/acre) of the MSU Orchardgrass, Tall Fescue, and Timothy Grass Trials seeded in Lake City, Michigan in July 2014

Orchardgrass	2016 Heading	2016 yields, Three-cuts and Total				2015	Two-year
	Date ‡	June 18	July 25	Sept 20	Total	Total	Total
Intensiv	June 9	2.04	0.44	0.53	3.01	3.78	6.80
Echelon	June 6	2.10	0.40	0.60	3.11	3.20	6.30
Persist	June 2	2.09	0.32	0.56	2.97	3.15	6.13
Potomac	June 2	1.96	0.34	0.49	2.78	3.24	6.03
Mean		2.05	0.38	0.55	2.97	3.34	6.32
LSD 0.05		0.67	0.19	0.31	1.14 ns	1.03 ns	2.14 ns
CV%		20.6	31.8	35.2	24.1	19.4	21.2

Tall Fescue	2016 Heading	2016 yields, Three-cuts and Total				2015	Two-year
	Date ‡	June 18	July 25	Sept 20	Total	Total	Total
Tuscany II	June 10	1.50	0.34	0.40	2.24	4.38	6.63
Kentucky 31 minus	June 10	1.38	0.34	0.33	2.05	4.43	6.48
Kentucky 31 Plus	June 10	1.29	0.39	0.44	2.12	4.32	6.44
Bariane	June 17	1.25	0.37	0.43	2.04	3.83	5.87
Mean		1.36	0.36	0.40	2.11	4.24	6.36
LSD 0.05		0.49	0.11	0.11	0.70 ns	0.85 ns	1.44 ns
CV%		22.4	18.6	18.4	20.6	12.6	14.2

Timothy	2016 Heading	2016 yields, Three-cuts and Total				2015	Two-year
	Date ‡	June 18	July 25	Sept 20	Total	Total	Total
Crest	June 13	2.06	0.22	0.56	2.84	4.58*	7.42*
Summit	June 10	1.86	0.16	0.64	2.65	4.40*	7.06*
Barpenta	Vegetative	1.98	0.19	0.47	2.64	3.63	6.26*
Climax	Vegetative	1.99	0.15	0.44	2.59	3.37	5.95
Mean		1.97	0.18	0.53	2.68	3.50	5.95
LSD 0.05		0.29	0.05	0.25	0.53 ns	0.77	1.27
CV%		9.4	19.8	29.4	12.3	12.1	11.9

* Yield is not statistically different from the greatest value in the column.
ns - Total yield among varieties 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
Vegetative - variety not headed on the date of first cutting

Table 34. 2016 DM yields (DM tons/acre) of the MSU Orchardgrass, Tall Fescue, and Timothy Grass Trials seeded in Chatham, Michigan in June 2014

Orchardgrass	2016 Heading	2016 yields, Two-cuts and Total			2015	Two-year
	Date ‡	June 17	Sept 15	Total	Total	Total
Intensiv	June 16	1.00	0.84	1.84	1.50*	3.33
Potomac	June 8	1.10	0.82	1.92	1.29	3.21
Persist	June 6	1.22	0.81	2.03	1.04	3.07
Echelon	June 15	0.91	0.91	1.82	1.22	3.04
Average		1.06	0.85	1.90	1.26	3.16
LSD 0.05		0.23	0.14	0.29 ns	0.16	0.32 ns
CV %		13.4	10.3	9.7	7.9	6.2
Tall Fescue	2016 Heading	2016 yields, Two-cuts and Total			2015	Two-year
	Date ‡	June 17	Sept 15	Total	Total	Total
Tuscany II	June 15	1.41	1.04	2.45*	2.05*	4.51*
Kentucky 31 plus	June 15	1.34	0.99	2.32*	2.02*	4.34*
Kentucky 31 minus	June 14	1.31	0.89	2.20*	1.94*	4.14*
Bariane	Vegetative	0.99	0.85	1.84	1.66	3.50
Average		1.26	0.94	2.20	1.92	4.12
LSD 0.05		0.21	0.14	0.29	0.23	0.41
CV %		10.6	9.6	8.4	7.4	6.3
Timothy	2016 Heading	Cut 1 and total			2015	Two-year
	Date ‡	June 17, 2016			Total	Total
Summit	June 15	2.02*			3.28	5.30*
Crest	June 17	1.82*			3.13	4.94*
Climax	Vegetative	1.53			3.15	4.68
Barpenta	Vegetative	1.46			3.07	4.53
Average		1.71			3.16	4.86
LSD 0.05		0.32			0.31 ns	0.53
CV %		11.4			6.1	6.8
* Yield is not statistically different from the greatest value in the column.						
ns - Total yield among varieties 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						
Vegetative - variety not headed on the date of first cutting						

Table 35. 2016 DM yields (DM tons/acre) of the MSU Orchardgrass, Fescue (Tall and Meadow), Perennial Ryegrass, Bromegrass, Timothy and Kentucky Bluegrass Grass variety Trials seeded in East Lansing, Michigan in May 2015

Orchardgrass					
	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 6	July 15	Oct 14	Total
OG 0707 †	May 22	1.59	0.38	1.76	3.73
GO-BXCR †	May 25	1.35	0.35	1.74	3.44
GO-MOSO †	May 23	1.42	0.42	1.72	3.56
Potomac	May 23	1.33	0.36	1.60	3.29
Mean		1.42	0.38	1.70	3.50
LSD 0.05		0.39	0.13	0.20	0.66 ns
CV %		17.1	21.8	7.4	11.7
Fescue					
(Tall and Meadow)					
	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 6	July 15	Oct 14	Total
Kentucky 31 Plus	May 26	1.34	0.48	1.63	3.45
Kentucky 31 minus	May 24	1.37	0.50	1.58	3.43
Bariane	June 5	1.07	0.48	1.76	3.32
Pradel (Meadow)	May 31	0.92	0.39	1.07	2.38
Mean		1.17	0.46	1.51	3.15
LSD 0.05		0.21	0.09	0.07	0.29
CV %		11.0	12.4	3.2	5.8
Perennial Ryegrass					
	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 6	Aug 4	Oct 14	Total
Linn	May 26	1.14	0.54	0.74	2.41
Albion	Vegetative	0.50	0.47	1.27	2.24
Mean		0.82	0.51	1.00	2.33
LSD 0.05		0.65	0.49	0.31	1.21 ns
CV %		35.1	42.9	13.6	23.2
Smooth Bromegrass					
	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 6	Aug 4	Oct 14	Total
GO-SBF †	May 28	1.75	0.59	0.78	3.12
Lincoln	Vegetative	1.62	0.48	0.96	3.05
Mean		1.68	0.54	0.87	3.09
LSD 0.05		0.31	0.10	0.21	0.34 ns
CV %		8.3	7.7	10.8	5.0
Timothy					
	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 6	Aug 4	Oct 14	Total
GO-120X †	June 4	1.89	0.35	1.12	3.36*
Climax	Vegetative	1.53	0.36	0.95	2.85
Mean		1.71	0.35	1.04	3.11
LSD 0.05		0.27	0.07	0.18	0.33
CV %		7.0	7.9	7.9	4.8

Table 35 continued next page (Kentucky bluegrass)

Table 35 continued. 2015 seeding of Kentucky Bluegrass at East Lansing

Kentucky Bluegrass	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 6	Aug 4	Oct 14	Total
Ginger	May 17	1.59	0.68	0.89	3.15
GO-13NF †	May 20	1.22	0.63	1.04	2.89
Mean		1.40	0.65	0.97	3.02
LSD 0.05		0.25	0.27	0.07	0.50 ns
CV %		7.8	18.1	2.8	7.4
† Experimental Entry, †† Variety Entered as an Experimental					
* Yield is not statistically different from the greatest value in the column.					
ns - Total yield among varieties 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					
Vegetative - variety not headed on the date of first cutting					

Table 36. 2016 DM yields (DM tons/acre) of the MSU Kentucky bluegrass, Timothy, Smooth Brome grass, Orchardgrass, Fescue, Perennial Ryegrass Grass Variety Trials seeded in Lake City, Michigan in July 2015

Kentucky Bluegrass	2016 Heading	2016 yields, Two-cuts and Total			
	Date ‡	June 18	July 25	Sept 20	Total
Ginger	June 2	NA †††	0.59	1.01	1.61
GO-13NF †	June 2	NA †††	0.58	1.00	1.59
Mean			0.59	1.01	1.60
LSD 0.05			0.07	0.07	0.05 ns
CV%			6.0	3.2	1.2
††† Volunteer Orchardgrass in first-cut yield - yield data not reported!					
Timothy	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 18	July 25	Sept 20	Total
Zenyatta	June 14	3.45	0.94	1.38	5.76
Summit	June 13	3.36	0.82	1.33	5.51
Climax	Vegetative	3.70	0.64	1.09	5.42
GO-120X †	Vegetative	3.48	0.79	1.10	5.37
Mean		3.50	0.80	1.23	5.52
LSD 0.05		0.29	0.22	0.11	0.46 ns
CV%		5.3	17.2	5.9	5.2
Smooth Brome grass	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 18	July 25	Sept 20	Total
Lincoln	June 5	4.07	0.70	0.75	5.52
GO-SBF †	June 2	3.87	0.77	0.75	5.38
Mean		3.97	0.74	0.75	5.45
LSD 0.05		0.46	0.19	0.23	0.20 ns
CV%		5.2	11.5	13.6	1.7

Table 36. continued next page (Orchardgrass, Fescue and P ryegrass)

Table 36. continued. 2015 seeding of Orchardgrass, Fescue and Perennial Ryegrass at Lake City.

Orchardgrass

	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 18	July 25	Sept 20	Total
Intensiv	June 12	3.13	1.07	1.17	5.36*
GO-BXCR †	June 8	2.72	0.93	1.33	4.98*
GO-MOSO †	June 7	2.47	0.96	1.34	4.77*
Persist	June 2	2.44	0.93	1.24	4.60
Potomac	June 2	2.47	0.90	1.16	4.53
Mean		2.65	0.96	1.25	4.57
LSD 0.05		0.36	0.21	0.23	0.71
CV%		8.8	13.8	12.2	9.6

Fescue (Tall and Meadow)

	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 18	July 25	Sept 20	Total
Tall Fescue					
Bariane	June 17	3.36	0.88	1.44	5.68
BAR FA 13131 †	June 15	3.58	0.66	1.28	5.53
Kentucky 31 minus	June 10	3.49	0.80	1.23	5.52
Tuscany II	June 10	3.40	0.65	1.28	5.34
Kentucky 31 Plus	June 11	3.38	0.69	1.16	5.23
LSD 0.05 Tall Fescue		ns	ns	ns	ns
Meadow Fescue					
Pradel (Meadow)	June 13	3.17	0.58	1.18	4.93
Bar FPF32 (Meadow) †	June 11	3.24	0.53	1.14	4.92
LSD 0.05 Meadow Fescue		ns	ns	ns	ns
Mean		3.37	0.68	1.24	5.31
LSD 0.05 among all varieties		0.36	0.16	0.23	0.67
CV%		7.2	15.6	12.2	8.5

Perennial Ryegrass

	2016 Heading	2016 yields, Three-cuts and Total			
	Date ‡	June 18	July 25	Sept 20	Total
Albion	Vegetative	3.43	0.48	0.96	4.88*
PayDay	Vegetative	3.45	0.47	0.77	4.69*
Mara	Vegetative	3.19	0.46	0.61	4.26
Mean		3.36	0.47	0.78	4.26
LSD 0.05		0.55	0.09	0.14	0.61
CV%		9.4	12.0	10.5	7.6

† Experimental Entry

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

ns - Total yield among varieties 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

Vegetative - variety not headed on the date of first cutting

Table 37. 2016 DM yields (DM tons/acre) of the MSU Orchardgrass, Tall Fescue, Kentucky Bluegrass, Bromegrass, Perennial ryegrass and Timothy Grass Variety Trials seeded in Chatham, Michigan in August 2015

Orchardgrass			2016 yields, Two-cuts and Total		
			Cut 1	Cut 2	2016
			June 15	Sept 15	Total
Potomac		June 5	1.29	1.20	2.49*
GO-MOSO †		June 3	1.18	1.08	2.26*
GO-BXCR †		June 8	1.18	0.93	2.11
Average			1.22	1.07	2.29
LSD 0.05			0.19	0.20	0.29
CV %			9.1	10.7	7.3
Fescue - (Tall and Meadow)			2016 yields, Two-cuts and Total		
			Cut 1	Cut 2	2016
			June 15	Sept 15	Total
Kentucky 32		June 13	1.59	1.10	2.68
Pradel (Meadow)		June 10	1.80	0.79	2.60
Kentucky 31 plus		June 13	1.49	1.02	2.52
Bariane		Vegetative	1.09	0.90	1.99
Average			1.49	0.95	2.45
LSD 0.05			0.27	0.18	0.37
CV %			11.1	11.8	9.5
Kentucky Bluegrass	Weed Pressure	2016 Heading Date ‡	2016 yields, Two-cuts and Total		
			June 14	Sept 21	Total
GO-13 NF †	4.3	June 2	0.48	0.61	1.08
Ginger	6.0	June 1	0.42	0.56	0.98
Average	5.2		0.45	0.59	1.03
LSD 0.05	2.0		0.10	0.05	0.12 ns
CV %	17.4		9.0	2.9	4.9
Bromegrass			2016 yields, Two-cuts and Total		
			Cut 1	Cut 2	2016
			June 14	Sept 21	Total
GO-SBF †	2.3	June 6	1.38	0.56	1.95
Lincoln	2.5	June 12	1.12	0.47	1.59
Average	2.4		1.25	0.52	1.77
LSD 0.05	1.5		0.33	0.28	0.53 ns
CV %	28.5		11.6	23.5	13.2

Table 37 continued next page (Perennial ryegrass and Timothy).

Table 37 continued - 2015 seeding of Perennial Ryegrass and Timothy at Chatham.

Perennial Ryegrass	2016 Heading Date ‡	Cut 1 and Total June 14, 2016
Linn	June 6	1.56*
Mara	Vegetative	1.27
Remington	Vegetative	1.15
Albion	Vegetative	0.93
Average		1.23
LSD 0.05		0.20
CV %		9.9

Timothy	2016 Heading Date ‡	Cut 1 and Total June 17, 2016
Zenyatta	June 15	1.67*
Climax	Vegetative	1.53*
GO-120X †	Vegetative	1.53*
Winnetow	Vegetative	1.02
Average		1.44
LSD 0.05		0.43
CV %		18.8

† Experimental Entry

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

ns - Total yield among varieties 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

Vegetative - variety not headed on the date of first cutting



Table 38. 2016 Seeding-year yields (DM tons/acre) of the MSU Perennial Grass Trials (Perennial Ryegrass, Timothy, Orchardgrass, and Fescue) seeded in East Lansing, Michigan in August 2016

Perennial Ryegrass

		Oct 14
Bison 2	Perennial (4n)	1.39
Maximo	Intermediate (4n)	1.08
Dexter 1	Perennial (4n)	0.85
Garbor	Perennial (4n)	0.75
Linn	Perennial (check)	0.52
Mean		0.92
LSD 0.05		0.16
CV %		11.2

Fescue

		Oct 14
Raskila	Meadow Fescue	1.20
Mahulena	Fest TF Type	1.04
FTF 96 †	Tall fescue	1.02
Kentucky 31 minus	Tall fescue	1.02
Fojtan	Fest TF Type	0.92
Pradel	Meadow Fescue	0.87
FTF73 †	Tall fescue	0.86
FTF70 †	Tall fescue	0.85
Tower	Tall fescue	0.72
Mean		0.94
LSD 0.05		0.20
CV %		14.6

Timothy

	Oct 14
TM0704 †	0.89
Zenyatta	0.83
Climax	0.69
Mean	0.80
LSD 0.05	0.27
CV %	19.3

Orchardgrass

	Oct 14
Echelon	0.94
Potomac	0.86
Treposno	0.83
Lyra	0.66
Mean	0.82
LSD 0.05	0.21
CV %	16.5

† Experimental Entry



Table 39. Michigan State University Annual Grass Variety Trial Yields (DM tons/acre) Michigan State University Agronomy Farm, East Lansing, Michigan. Seeded May 2015

Entry	Annual Grass type	2016 yields, Two-cuts and Total			2015 Three-cut Total
		June 8	July 13	Total	
McKinley	Diploid Westerwold	1.95	0.28	2.23	2.95
DLFPS-LMT-15 †	Italian Ryegrass	1.88	0.25	2.13	2.42
DLFPS-LWT-14 †	TetraPloid Westerwold	1.63	0.28	1.90	2.74
Kodiak	Diploid Westerwold	2.07	0.34	2.41	2.84
Becva	Festulolium	1.92	0.19	2.11	2.34
Dessie	Teffgrass	Winterkill, no yield in 2016			3.62 *
Mean of Five surviving Entries in 2016		1.89	0.27	2.16	Mean 2.82
LSD (0.05) in 2016		0.21	0.07	0.23	LSD 0.45
CV%		6.8	15.5	6.9	CV 10.7
Two commercially available varieties seeded in border plots and harvested for yield.					
Annual Ryegrass (Check 1)		1.72	0.24	1.96	3.02
Annual Ryegrass (Check 2)		1.85	0.36	2.20	2.29

Table 40. 2016 DM Yields (DM tons/acre) of the MSU Multiple-cut Sudangrass - Sorghum Sudangrass and the Single-cut Forage Sorghum yield trials in East Lansing, Michigan. Planted in June 2016

Multiple-cut Sudangrass and Sorghum Sudangrass

Entry		2016 Yield, Two-cuts and Total		
		Aug 23	Oct 11	Total
Piper	Sudangrass	3.12	1.67	4.79
E 666	Sudangrass	2.53	1.80	4.32
Nutra King BMR	Sorghum Sudangrass	2.90	1.14	4.04
Sweet Six BMR	Sorghum Sudangrass	2.67	1.18	3.86
Greengrazer V	Sorghum Sudangrass	2.36	1.24	3.61
Super Sugar DM	Sorghum Sudangrass	2.63	0.91	3.54
Sweet Forever BMR	Sorghum Sudangrass	2.27	0.70	2.97
BMR 300	Sorghum Sudangrass	2.05	0.42	2.47
Average		2.57	1.13	3.73
LSD 0.05		0.39	0.34	0.65
CV %		10.4	20.3	11.9

Single-cut Forage Sorghum Yield trial, East Lansing, Michigan.

Entry		Cut on Oct 11, 2016	
		DM Yield T/A	DM %
GW 600 BMR	Forage Sorghum	5.42	23.2
GW 400 BMR	Forage Sorghum	5.20	20.8
EXP 10216 BMR †	Forage Sorghum	4.91	23.5
Silo Pro BMR	Forage Sorghum	3.52	20.3
Average		4.76	21.9
LSD 0.05		1.31	2.0
CV %		17.2	5.8

† Experimental Entry

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
Byron Seed	888-836-3697	www.bestforage.com
CHS Seeds	541-928-2393	www.chsseedresources.com
Cimarron USA	800-874-7945	www.cimarronusa.com
CISCO Seed	800-888-2986	www.ciscoseeds.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/
DLF-International Seeds	800-445-2251	www.dlfis.com
Forage First	517-749- 7364	www.foragefirst.com
Great Lakes hybrids	800-257-7333	www.greatlakeshybrids.com
Hyland Seed	800-265-7403	www.hylandseeds.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
Midvalley Ag Prod.	541-752-2408	unavailable
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 Hi-bred Int'l	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
Spink Seed Co.	517-745-5804	unavailable
Standish Milling	989-846-6911	unavailable
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