

2017 Michigan Forage Variety Test Report

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Forage crops are essential components of diversified agricultural production systems in Michigan. They provide feed for livestock, fix nitrogen for crop rotations, reduce soil erosion, improve soil structure, fertility and water retention, protect water quality, provide habitat for wildlife, generate biomass for fuel conversion, and create eye appeal to landscapes. Competition from row crops for land use continues to squeeze forage production acres while equipment, land, and labor costs increase. Under these market conditions, the importance of improving yield per acre through use of better forage varieties is an important component of profitability. Michigan hay prices were good in 2017, and a one-ton increase of average quality alfalfa hay yield was worth \$130 to 160/acre.

2017 Conditions.

Annual rainfall total and 30-year averages for April through October in East Lansing in southern Lower Michigan, Lake City in northern Lower Michigan, and Chatham in the Upper Peninsula are in **Table 1**. Temperatures were mild during the winter of 2016/2017. April was cool, and below normal temperatures continued through the first half of May. Precipitation totals were above average at all three locations during April. Conditions were variable across the state during the summer months. After the wet spring, East Lansing quickly became dry with rainfall totals well below normal for May through September. Lake City rainfall was above average in June, but slightly below average the remaining months in 2017. Monthly precipitation totals at Chatham in the Upper Peninsula were well above average in May, June and slightly above average in August. All three locations were wet during October, limiting the possibility of a late fall harvest, especially at East Lansing.

2017 - Alfalfa and Red Clover

In 2017, alfalfa was cut four or five times at East Lansing and three times at Lake City and Chatham. Total test yields of alfalfa varieties planted at multiple locations in Michigan variety trials since 2009 are listed in **Tables 4 to 7**.

Total yields for previous years and individual cuttings and total for 2017 are in **Tables 11 to 26** (Pages 11 to 26).

First cutting was slightly ahead of previous years at East Lansing and Lake City as alfalfa maturity was earlier in 2017 than in 2016. First cutting at East Lansing began on May 23 and was finished by May 30. Remaining harvests at East Lansing were scheduled around a 28 to 33-day harvest interval. A late fall harvest at East Lansing did not occur if the soil was too wet to adequately support the equipment without potentially damaging the alfalfa crowns. Dry conditions at East Lansing resulted in low yields for cuts 2 through 4. The 2014 seeding planted on a Colwood Brookston loam had a slightly greater yield than trials planted on the Capac loam soil. Therefore, the soil type that results in difficult growing conditions during a “wet” year had the highest yield potential during a dry year. The highest yielding alfalfa test at East Lansing in 2017 was from the 2014 seeding year. This trial was harvested only three times in 2015 because of the frequent rain, four times in 2016 and five times in 2017. Thirteen conventional varieties averaged 4.70 and ranged from 4.24 to 5.48 tons/acre. The five RR varieties ranged from 4.40 to 4.81 tons/acre. The 2015 and 2016 Conventional and RR trial seedings were harvested four times in 2017. In the 2015 seeding, the conventional varieties averaged 4.12 and ranged from 3.07 to 4.51 tons/acre. The four RR varieties ranged from 3.36 to 4.49 tons/acre. First-year yields from the 24 conventional varieties in the 2016 seeding averaged 4.95 and ranged from 3.84 to 5.66 tons/acre. The six RR varieties averaged 4.47 and ranged from 4.24 to 4.69 tons/acre. The alfalfa variety ‘Vernal’ was one of the lowest yielding in 2017 and was 20 to 30 percent lower than the highest producing varieties at East Lansing. At a fall dormancy of 2, Vernal is more adapted to a three or four-cut system and is not suited for an intensive 28 to 33-day harvest schedule. Two new trials (Conventional and RR) were seeded at East Lansing in May 2017.

First cutting of trials at Lake City was on the same schedule as local producers in 2017, with



first cut on June 6, second cut on July 14, and third cut on September 1. At Lake City, greatest yield in 2017 was obtained from the 2015 seeding, where average yield in the conventional trial was 4.32 and ranged from 3.97 to 4.52 tons/acre. Yields in the 2015 RR variety trial averaged 3.27 and ranged from 2.87 to 3.56 tons/acre. In the 2014 seeding, average total yield of the conventional varieties was 3.78 and ranged from 3.38 to 4.20 and the RR variety average was 3.17 ranging from 3.14 to 3.21 tons/acre. First-year total yields from the 2016 seedings of the conventional and RR varieties, respectively, averaged 3.47 (range from 3.34 to 3.66) and 3.20 tons/acre (range from 3.00 to 3.34). First cutting at Chatham was scheduled between the frequent rains. Cutting dates were June 22, August 2, and October 4 in 2017. Average yield of the varieties in the 2015 conventional seeding at Chatham was 2.60 and ranged from 2.45 to 2.78 tons/acre. Yields of the varieties in the 2015 RR seeding averaged 2.33 and ranged from 2.12 to 2.49 tons/acre. Two new trials (Conventional and RR) were established at Chatham in the late summer of 2017.

A red clover variety trial was seeded in May at East Lansing. This is the first red clover trial to be established in several years. Five varieties were seeded in the new trial in 2017. An excellent stand was achieved. Weeds were controlled by cutting and spraying a herbicide. Yields are reported from one harvest in late August. Very little growth occurred in the red clover after the August cutting. Yields ranged from 0.94 to 1.31 tons per acre and second-cutting yields are listed in **Table 27** (page 26).

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Table 1. Actual and 30-year average precipitation (Inches) from April to October 2010 to 2017 at three variety test sites across Michigan.									
	2010	2011	2012	2013	2014	2015	2016	2017	Avg
	East Lansing								
Apr	2.37	5.21	1.53	7.78	1.07	1.10	1.22	5.17	2.87
May	5.10	6.81	3.40	4.35	3.66	4.83	2.97	2.47	3.18
June	4.70	1.85	1.50	5.23	5.60	7.23	0.97	2.30	3.67
July	2.15	4.76	1.80	2.49	2.97	2.89	3.76	2.30	3.13
Aug	0.71	3.50	2.70	5.74	5.33	6.15	6.83	1.99	3.69
Sept	3.79	2.09	2.52	0.89	4.49	4.34	3.47	1.26	3.61
Oct	1.35	3.08	4.69	5.24	2.41	1.92	3.70	8.15	2.75
Total	20.17	27.30	18.14	31.72	25.53	28.46	22.92	23.64	22.90
	Lake City								
Apr	3.09	7.09	2.20	5.09	6.58	2.58	2.20	5.50	2.95
May	2.35	2.44	5.30	3.02	3.29	4.57	2.26	2.78	3.22
June	4.69	4.11	3.03	1.87	2.94	2.91	2.21	4.96	3.39
July	5.18	2.15	7.32	2.03	3.17	2.25	5.74	2.43	2.81
Aug	2.77	3.61	1.97	4.15	1.69	4.10	2.25	2.31	3.72
Sept	2.97	2.61	3.45	1.66	4.07	4.14	3.30	1.66	3.63
Oct	1.36	3.85	4.35	3.09	4.29	2.78	3.07	7.62	3.30
Total	22.41	25.86	27.62	20.91	26.03	23.33	21.03	27.26	23.02
	Chatham								
Apr	0.95	3.35	1.05	3.30	3.32	2.03	3.21	5.25	2.15
May	1.61	3.10	2.43	2.20	3.36	5.60	3.45	4.99	3.05
June	6.82	4.03	4.34	2.77	3.85	2.67	2.34	7.36	3.02
July	5.73	1.41	4.47	4.78	4.27	2.15	3.44	1.74	3.41
Aug	1.96	0.73	2.12	2.68	3.18	1.86	3.67	5.50	3.17
Sept	8.62	5.26	5.13	2.71	3.53	2.41	4.78	3.26	4.21
Oct	2.18	2.75	5.55	3.06	6.98	4.25	6.90	7.82	4.47
Total	27.87	20.63	25.09	21.50	28.49	20.97	27.79	35.92	23.48

2017 Grass Variety Trials

Perennial Grass Trials

Seven cool-season grass species or hybrid groups (orchardgrass, fescue, bromegrass, perennial ryegrass, timothy, Kentucky bluegrass and festulolium) have been seeded in trials at the three locations since 2014 and are being evaluated for yield, maturity at first cutting, and persistence. Established tests were cut three times at East Lansing and Lake City in 2017. Trials at Chatham were harvested one or two times, depending on species, in 2017. 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 2017 are in **Tables 28 to 37** (Pages 29 to 38). Highest yields at East Lansing were obtained with the first cutting. Second-cut yields were somewhat better when first cut was taken on May 19 than when first cut was on May 27. The earlier date of first cutting may have allowed for some second growth from the lower temperatures and residual moisture remaining in the soil. Third cutting yields benefited from some timely rain after second cutting. Among cool-season grasses, tall fescue and orchardgrass were the most productive in the middle of summer. Very little regrowth occurred after the

third cutting in late August due to the continued dry and unseasonable hot weather in late September.

Yields obtained for the third year of the 2014 seeding for tall fescue ranged from 3.24 to 4.30, meadow fescue and festulolium ranged from 1.62 to 2.55, timothy from 2.03 to 3.10, perennial ryegrass from 0.97 to 2.82, bromegrass from 2.60 to 3.36, and orchardgrass from 1.84 to 2.45 tons/acre, respectively. In the 2015 trial seeding, yields of tall and meadow fescue ranged from 2.01 to 3.04, orchardgrass from 2.78 to 2.95 tons per acre. Average yield, respectively, of two varieties each of timothy was 2.68, perennial ryegrass was 2.26, bromegrass was 1.97, and

Kentucky bluegrass was 1.74 tons per acre in 2015 seeding. In the 2016 seeding, yields of fescue (tall, meadow, festulolium) averaged 3.57 and ranged from 3.15 to 3.78, orchardgrass average was 4.34 and ranged from 4.19 to 4.69, timothy average was 3.38 and ranged from 3.27 to 3.54, and perennial ryegrass average was 3.39 and ranged from 2.90 to 4.04 tons per acre, respectively. At Lake City, greatest grass yields were obtained in the 2015 seeding. Three-cut total yield, in tons/acre, of orchardgrass averaged 3.83 and ranged from 3.69 to 4.01, fescues (tall and meadow) averaged 4.21 and ranged from 3.67 to 4.44, timothy averaged 4.75 and ranged from 4.55 to 5.08, and perennial ryegrass averaged 2.61 and ranged from 2.22 to 2.84. Two varieties of bromegrass yielded 3.58 and 3.73 tons/acre, respectively. 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 2.79 to 3.28, tall fescue ranged from 2.46 to 2.78, and timothy ranged from 2.81 to 3.53 tons/acre. New variety trials of timothy, perennial ryegrass, fescue, and orchardgrass were established at East Lansing and Lake City in 2017.

Grass variety trials at Chatham have many of the same grass varieties as in Lake City. Chatham is farther north where only 1 to 2 cuts per year may be feasible, depending on species. First cutting was in June and second cutting in October in 2017. Orchardgrass and fescue (tall and meadow) were harvested twice in 2017 and timothy trials were cut once. Average total yields in the 2014 seeding for orchardgrass was 1.64 (range 1.59 to 1.72), tall fescue was 1.30 (range 1.09 to 1.45) and timothy was 1.51 (range 1.30 to 1.69) tons/acre. In the 2015 trial, orchardgrass averaged 1.10 and ranged from 0.97 to 1.20, fescues averaged 1.02 and ranged from 0.86 to 1.16, timothy yields averaged 1.94 and ranged from 1.82 to 2.09 tons/acre in 2017.

Grass varieties may be marketed as early, medium, or late maturing. Grass maturity should be matched to legume maturity when planting in mixtures. Plant maturity ratings are reported in **Table 10** for East Lansing, Lake City and Chatham as the date when varieties reached 50% heading in the first cutting of the established trials. Some varieties never reached 50% heading before the harvest date and were rated as either vegetative, boot, or early heading (less than 25%). Grass maturity and the subsequent date of first cutting was earlier this year than previous years and all harvests on campus were completed before Memorial Day. Maturity dates spanned more than 10 days from earliest to latest within species at East Lansing, and up to 7 days at the two northern locations. Using 'Potomac' orchardgrass check as a marker in 2017, grasses generally reached 50% heading about 2 weeks later in Lake City and three

weeks later in Chatham than in East Lansing.

2017 Annual Grass Trial

Seven varieties of Italian ryegrass, one annual ryegrass (check), one black oat variety, and a regular oat variety (check) were evaluated in 2017. The annual ryegrass and oat varieties had headed on each cutting date in 2017. The seven Italian ryegrass entries, however, were still in the vegetative stage on each cutting date. Persistence and additional yield evaluation is anticipated in 2018. Total and per cutting yield for 2017 are listed in **Table 38** (page 38).

ALFALFA VARIETY TEST

Michigan State University has evaluated 116 commercially available alfalfa varieties in its alfalfa variety trials since 2009. Plant breeders, developers, and marketers submit alfalfa varieties for evaluation. Varieties seeded in these trials are evaluated for yield and persistence for three full years after the seeding year. Testing locations in 2017 for the Michigan alfalfa variety trials were the Upper Peninsula Research and Extension Center at Chatham, the Lake City Research Center at Lake City, and the Michigan State University Agronomy Farm at East Lansing. Because glyphosate is used for weed control in Roundup-Ready trials, these are conducted as separate tests from conventional varieties. Vernal, a fall-dormant (FD 2) public variety released in 1953 has poor disease resistance compared to modern varieties, is used as the historical check variety to maintain long-term comparisons across time. An index value for variety yield as a percent of Vernal is presented for each conventional alfalfa entry. Because there is no industry standard check variety with the RR trait, index values in RR alfalfa tests are presented as a percentage of the test average.

Alfalfa Trait Ratings.

Ratings for plant traits are shown in **Table 3**. *Roundup Ready* (RR) varieties are resistant to the herbicide glyphosate (Roundup and many other trade names) which can simplify weed control during the critical alfalfa establishment phase.

Fall Dormancy and Winterhardiness Ratings.

Fall dormancy (FD) ratings are determined by the amount of regrowth after a mid-September cutting. They depend on alfalfa response to daylength and temperature and are useful as an indicator of growth rate potential after cutting or winter dormancy. Moderately dormant (FD = 5) varieties grow back faster, mature 4 to 5 days earlier, and often yield more than dormant (FD = 3-4) or very dormant (FD = 1-2) varieties in early years of stands and under aggressive cutting schedules, but may be less persistent in

Michigan than more dormant varieties when stands are maintained for four years or more, 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.

Winter survival index (WSI) is the preferred rating system for evaluating winterhardiness of alfalfa varieties. A lower WSI value indicates better winterhardiness. Within a FD rating, varieties can differ considerably for winter survival index (WSI). The FD and WSI ratings for varieties in the Michigan tests are given in **Table 3**.

Alfalfa Disease and Pest Ratings.

An alfalfa variety consists of a population of plants which are genetically different from each other. Varieties are described according to the mean response of all plants, such as average yield, and as a frequency of certain types of plants, such as the percentage of plants resistant to some pest or disease. Thus, even in a "resistant" variety, only a portion of the plants will be resistant. Moderate resistance, for example, means that 15 to 30% of the established plants are resistant, leaving 70 to 85% susceptible. Therefore, a variety classified as resistant may still suffer damage from a disease, especially in the seedling stage. Moderate resistance is generally considered adequate for good alfalfa production. A list of disease resistance ratings for varieties evaluated at MSU is provided in **Table 3**. Additional information and pictures of alfalfa diseases can be found at www.alfalfa.org/pdf/AlfalfaAnalyst.pdf.

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

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

Anthracnose (AN). This disease was first found in Michigan in 1976. It occurs during hot, moist summers and is most common in the southern third of Lower Michigan. The fungus infects stems and crowns and may kill

some plants. We recommend that only anthracnose resistant varieties be planted in Michigan.

Verticillium Wilt (VW). First detected in Michigan in 1982, VW has not increased in severity as expected. It is generally introduced with infected seed and is usually not a problem until the third year, and then primarily in the first cutting. Growing alfalfa 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.

How to Select an Alfalfa Variety for Michigan. Appropriate variety selection depends on location, desired stand life, cutting management, yield goal, and forage quality goal. Location matters because fewer cuttings are possible in shorter growing seasons. Intensive six-cut systems are possible in 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= 4-5), 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 or for Northern Michigan and UP regions, 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 increases with the number of

environments (i.e. the number of tests) in which the variety has been tested. Therefore, varieties that have been entered in only one or two tests may not perform as expected in a farm situation.

EVALUATION OF OTHER LEGUMES

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

PERENNIAL COOL-SEASON GRASS TEST

A brief description of grass species with a summary of management recommendations is in **Table 2**. When selecting a grass variety, first consider adaptation of the species to the conditions of the proposed site and intended use as hay/haylage or pasture. Only then should individual varieties and desired yield come under consideration. The reliability of variety rankings increases with the number of environments (i.e. the number of tests) in which the variety has been tested. Therefore, varieties that have been entered in only one or two tests may not perform as expected in a farm situation.

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

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

Timothy (*Phleum pratense* L.) is a bunchgrass that forms an open sod and persists well under poorly drained conditions. It is best known for its winterhardiness and ability to survive under ice sheeting. Timothy is a late-maturing grass that 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, heat, drought, and poor drainage on a range of soil types, but has less cold tolerance for Northern Michigan than many other grasses. Tall fescue naturally contains an endophytic fungus that aids plant stress tolerance, but produces alkaloids toxic to livestock eating the forage. Many improved new varieties of **tall fescue** are endophyte-free or contain “friendly” novel endophytes that are not toxic to animals. Tall fescue varieties containing the toxic wild-type endophyte (E+) are not recommended for Michigan. **Meadow fescue** has better forage quality, palatability, and cold tolerance than tall fescue and does not contain toxic endophytes.

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

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

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

Kentucky bluegrass (*Poa pratensis* L.) is a relatively short-statured, sod-forming perennial grass that is very palatable when vegetative. It persists under frequent, close grazing and is very winter hardy in Michigan, but is unpalatable when heading and quickly goes dormant under hot, dry summer conditions. Because of low yield potential, Kentucky bluegrass is more suitable for

grazed than harvested forage systems.

ANNUAL GRASS TESTS

An annual grass trial was established 2017 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 this trial, and it was fertilized with 50 lbs/acre N prior to first cutting and after first and second cutting. These trials are planted in the spring and typically harvested three times in the seeding year. Winter survival is evaluated the following spring and yield is obtained on surviving entries.

STATISTICS

Comparison of yields among varieties should only be made within a trial. Under these conditions, statistical tests allow accurate separation of true genetic effects from random variation attributed to field or weather conditions.

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

average annual yield for the years available, excluding the establishment year. Check varieties are included in most tests to provide reference points for estimation of relative differences among tests conducted in different years or sites. The relative difference among varieties is expressed as a percentage of the check variety yield. Choice of varieties used as checks is based on familiarity to most producers across a wide area of the USA. Where check varieties are not available, relative differences are expressed as a percentage of the test average. Statistics including Least Significant Difference (LSD) and Coefficient of Variation (CV) for all variety trials are listed in the yearly yield data. When the difference in yield between two varieties is greater than the LSD 0.05 value, it is 95% certain that the difference between the two varieties is real. If the difference is less than or equal to the LSD value, the variety yields are statistically the same. Coefficient of Variation is an indicator of consistency across the test replications, with a lower value being desirable. Consistency across replications is desirable because it allows statistical significance at lower LSD values.

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.											

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4	10	Long-term yield averages from MSU Alfalfa Variety Trials seeded in East Lansing from 2009 to 2016
5	11	Long-term yield averages from MSU Alfalfa Variety Trials seeded in Lake City from 2009 to 2016.
6	12	Long-term yield averages from MSU Alfalfa Variety Trials seeded in Chatham between 2008 and 2015.
7	13	Yields of Roundup Ready Alfalfa Varieties seeded from 2013 to 2016 at East Lansing, Lake City, and Chatham.
8	14,15	Long-term average yields of perennial forage grasses seeded from 2006 to 2016, and 1-year total from 2016 at East Lansing.
9	16	Forage Yield of Perennial Forage Grasses Seeded at Lake City in Northern Lower Michigan and at Chatham in the Upper Peninsula.
10	17,18	MSU Grass Maturity Dates in First Cutting of 2017 in the Perennial Grass Variety Trials at East Lansing, Lake City, and Chatham.
11	19	2017 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2014.
12	19	2017 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2014.
13	20	2017 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2015.
14	20	2017 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2015.
15	21	2017 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2016.
16	21	2017 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2016.
17	22	2017 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2014.
18	22	2017 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2014.
19	23	2017 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2015.
20	23	2017 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2015.
21	24	2017 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2016.
22	24	2017 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2016.
23	25	2017 Yield summary of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Chatham, Michigan in August 2015.
24	25	2017 Yield summary of the MSU Conventional Alfalfa Variety Trial Seeded in Chatham, Michigan in August 2015.
25	26	2017 Seeding-year yields of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2017.
26	26	2017 Seeding-year yields of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2017.
27	26	2017 Seeding-year yields of the MSU Red Clover Variety Trial Seeded in East Lansing, Michigan in May 2017.
28	27	2017 DM yields of the MSU Fescue (Tall, Meadow, Festulolium) Variety Trial seeded in East Lansing, Michigan in May 2014.
29	28	2017 DM yields of the MSU Perennial Ryegrass and Bromegrass Variety trials seeded in East Lansing, Michigan in May 2014.
30	29	2017 DM yields of the MSU Orchardgrass and Timothy Variety trials seeded in East Lansing, Michigan seeded in 2014.
31	30	2017 DM Yields of the MSU Orchardgrass, Tall Fescue, and Timothy Grass Variety Trials seeded in Lake City, Michigan in July 2014.
32	31	2017 DM Yields of the MSU Orchardgrass, Tall Fescue, and Timothy Grass Variety Trials seeded in Chatham, Michigan in June 2014.
33	32,33	2017 DM Yields of the MSU Orchardgrass, Fescue (Tall and Meadow), Perennial Ryegrass, Bromegrass, Kentucky Bluegrass, and Timothy Grass Variety Trials seeded in East Lansing, Michigan in May 2015.
34	33,34	2017 DM Yields of the MSU Orchardgrass, Perennial Ryegrass, Bromegrass, Timothy, and Fescue (Tall and Meadow) Grass Variety Trials seeded in Lake City, Michigan in July 2015.
35	35,36	2017 DM Yields of the MSU Timothy, Tall Fescue, and Orchardgrass, Fescue, Timothy, Perennial Ryegrass, Kentucky Bluegrass, and Smooth Bromegrass Grass Variety Trials seeded in Chatham, Michigan in August 2015.
36	36,37	2017 DM yields of the MSU Perennial Ryegrass, Timothy, Orchardgrass, and Fescue (Tall, Meadow, and Festulolium) Grass Variety Trials seeded in East Lansing, Michigan in August 2016.
37	38	2017 Seeding-year yields of the MSU Perennial Grass Variety Trials (Tall and Meadow Fescue, Perennial Ryegrass and Festulolium, Orchardgrass, and Timothy) seeded in East Lansing, Michigan in May 2017.
38	38	2017 Yields of the MSU Annual Grass Variety Trial seeded in East Lansing, Michigan in May 2017.

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

Variety	FD †	WSI ††	BW ‡	PRR	AN	VW	FW	Aph 1	Aph 2	SN	RR	PLF	Multi	Salt	Stand	Marketer
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
6431	4	2	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	-	NEXGROW
428RR	4	1	HR	HR	HR	HR	HR	HR	-	MR	RR	-	H	G	-	Allied Seed
4A415	2	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Mycogen
4A421	4	2.5	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Mycogen
4S417	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Mycogen
430 RR LH	4	2	HR	HR	HR	HR	HR	HR	-	MR	RR	HR	H	-	-	Farm Science
6200HT	2	2.5	HR	HR	HR	HR	HR	HR	-	MR	-	-	-	-	-	NEXGROW
6305Q	3	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	NEXGROW
6422Q	4	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	NEXGROW
6424R	4	2	HR	HR	HR	HR	HR	HR	HR	R	RR	-	H	-	-	NEXGROW
6475H	4	2	HR	HR	HR	HR	HR	HR	-	R	-	HR	H	-	-	NEXGROW
6497R	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	NEXGROW
6585Q	5	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	H	-	-	NEXGROW
9200 RR	4	1.5	HR	HR	HR	HR	HR	HR	-	-	RR	-	-	-	-	Great Lakes Hybrids
AFX 429	3	-	HR	HR	HR	HR	HR	HR	R	R	-	-	L	-	-	Alforex Seeds
AFX 469	4	-	HR	HR	HR	HR	HR	HR	-	HR	-	-	L	G	-	Alforex Seeds
AlfaFour Supreme	4	2	HR	HR	HR	HR	HR	HR	R	R	-	-	-	-	-	CHS Seed
AmeriStand 403T Plus	4	2	HR	HR	HR	HR	HR	HR	R	MR	-	-	-	-	-	America's Alfalfa
AmeriStand 407TQ	4	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	H	-	-	America's Alfalfa
AmeriStand 409LH	4	2	HR	HR	HR	HR	HR	HR	-	R	-	HR	-	-	-	America's Alfalfa
AmeriStand 455TQ RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	America's Alfalfa
Armour	4	2	HR	HR	HR	HR	HR	HR	-	-	RR	-	-	-	-	Becks Hybrids
Caliber	4	2	HR	HR	HR	HR	HR	HR	MR	MR	-	-	-	-	-	Becks Hybrids
CavalryDQ	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Becks Hybrids
Chesapeake	3	2	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	AgReliant
Contender	5	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Becks Hybrids
DG 3210	3	1	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	Crop Production
DG 4210	4	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Crop Production
DK140	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Check variety
DKA33-16	3	-	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Dekalb
DKA40-51RR	4	1	HR	HR	HR	HR	HR	HR	HR	R	RR	-	-	-	-	Dekalb
DKA41-18RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Dekalb
DKA43-13	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Dekalb
DKA43-22RR	4	2	HR	HR	HR	HR	HR	HR	R	HR	RR	-	H	-	-	Dekalb
DKA44-16RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	Dekalb
Enduro Elite	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Cisco Seeds
Evergreen 3	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	NEXGROW
Everlast II	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Crop Production
FF42.A2	4	1.9	HR	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	Lacrosse
Fierce	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Becks Hybrids
ForageGold	4	2	HR	HR	HR	HR	HR	HR	-	R	-	-	M	-	-	Renk Seed
Fortune	4	-	HR	HR	HR	HR	HR	HR	-	R	-	-	-	-	-	DLF International
FSG 329	3	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	L	-	-	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 415 BR	4	2	HR	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
GA 409	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Pref Alfalfa Gen
GA 497 HD	5	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Pref Alfalfa Gen
Gunner	5	1	HR	HR	HR	HR	HR	HR	-	R	-	-	H	-	-	Croplan Genetics
Hi-Gest 360	3	1.5	HR	HR	HR	HR	HR	HR	HR	R	-	-	M	G	-	Alforex Seeds
HybriForce 2400	4	1.8	HR	HR	HR	HR	HR	HR	-	HR	-	-	-	F	-	Dairyland Seeds
HybriForce 3400	4	1.5	HR	HR	HR	HR	HR	HR	MR	HR	-	-	-	-	-	Dairyland Seeds
HybriForce 3400QR	4	1.5	HR	HR	HR	HR	HR	HR	MR	-	-	-	-	-	-	Dairyland Seeds

Table 3 continued next page

Table 3 continued

Variety	FD †	WSI††	BW ‡	PRR	AN	VW	FW	Aph 1	Aph 2	SN	RR	PLF	Multi	Salt	Stand	Marketer
HybriForce 3420	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Dairyland Seeds
HybriForce 3420/Wet-OB1	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Osprey Biotechnics
HybriForce 3420/Wet-OB2	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Osprey Biotechnics
HybriForce 3430	4	-	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	-	Dairyland Seeds
HybriPro BR	5	-	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Hyland Seeds
Integra 8420	4	-	HR	HR	HR	HR	HR	HR	HR	HR	-	-	M	-	-	Wilbur-Ellis
Integra 8444R	4	-	HR	HR	HR	HR	HR	HR	HR	HR	RR	-	M	G/F	-	Wilbur-Ellis
Integra 8450	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Wilbur-Ellis
KingFisher 243	5	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Byron Seeds
KingFisher 4020	4	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Byron Seeds
KF406A2	4	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Byron Seeds
KF425HD	5	2	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Byron Seeds
L455HD	4	-	HR	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	HR	-	-	-	L	-	Brett Young
Oneida VR	3	-	R	MR	MR	HR	HR	-	-	-	-	-	-	-	-	Public
PGI 459	4	2	HR	HR	HR	HR	HR	R	R	HR	-	-	-	-	-	Alforex Seeds
PGI 529	5	2	HR	HR	HR	HR	HR	-	-	R	-	-	M	-	-	Alforex Seeds
PGI 557	5	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	L	-	-	Alforex Seeds
Pioneer 53H92	3	-	HR	HR	HR	R	HR	HR	-	-	-	HR	-	-	-	Pioneer
Pioneer 54Q14	4	1	HR	HR	HR	HR	HR	HR	R	MR	-	-	-	-	-	Pioneer
Pioneer 54Q32	4	-	HR	HR	HR	HR	HR	HR	-	LR	-	-	-	-	-	Pioneer
Pioneer 55H94	5	-	HR	HR	HR	HR	HR	HR	-	HR	-	HR	-	-	-	Pioneer
Pioneer 55Q27	5	1	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Pioneer
Pioneer 55QR04	4	1	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Pioneer
Pioneer 55V12	5	-	R	HR	HR	HR	HR	HR	R	R	-	-	-	-	R	Pioneer
Pioneer 55V48	5	-	HR	HR	HR	R	HR	HR	R	R	-	-	-	-	-	Pioneer
Pioneer 55V50	5	-	HR	HR	HR	HR	R	HR	HR	R	-	-	-	-	-	Pioneer
Pioneer 55VR06	5	1	HR	HR	HR	HR	R	HR	MR	MR	RR	-	-	-	-	Pioneer
Pioneer 55VR08	5	-	HR	HR	HR	HR	HR	HR	HR	R	RR	-	-	-	-	Pioneer
Prolific II	3	2	HR	HR	HR	HR	HR	HR	R	HR	-	-	-	-	-	Hyland Seeds
Radiance HD	4	2	HR	HR	HR	R	HR	HR	-	-	-	-	-	-	-	Ampac Seeds
Rebound 6.0	4	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	Croplan Genetics
Rebound 6XT	4	1	HR	HR	HR	HR	HR	HR	HR	-	-	-	H	-	-	CropLan Genetics
RR AphaTron 2XT	4	1	HR	HR	HR	HR	HR	HR	HR	-	RR	-	H	G	-	CropLan Genetics
RR Stratica	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	G	-	Croplan Genetics
RR501	5	2	HR	HR	HR	-	HR	HR	-	HR	RR	-	H	G/F	-	Channel
SolarGold	4	2	HR	HR	HR	HR	HR	HR	MR	MR	-	-	H	-	-	Renk Seed
Sonic	4	1	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Nutech Seed
StarGold	5	-	HR	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	Renk Seed
Stalwart II	5	1.5	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Great Lakes Hybrids
SW4107	4	-	HR	HR	HR	HR	HR	HR	HR	R	-	-	-	-	-	S&W Seeds
Velocity	4	2	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	Nutech Seed
Vernal	2	2	R	S	S	S	MR	S	-	S	-	-	-	-	-	Public
WL 343 HQ	4	1.5	HR	HR	HR	HR	HR	HR	-	MR	-	-	H	-	-	W-L Research
WL 353 LH	4	2	HR	HR	HR	HR	HR	HR	-	R	-	HR	-	-	-	W-L Research
WL 354 HQ	4	1	HR	HR	HR	HR	HR	HR	HR	R	-	-	H	-	-	W-L Research
WL 356 HQ RR	4	1	HR	HR	HR	HR	HR	HR	HR	HR	RR	-	H	G	-	W-L Research
WL 363 HQ	5	2	HR	HR	HR	HR	HR	HR	-	HR	-	-	H	-	-	W-L Research
WL 365 HQ	5	1	HR	HR	HR	HR	HR	HR	-	-	-	-	-	-	-	W-L Research
WL 372 HQ RR	5	2	HR	HR	HR	HR	HR	HR	-	HR	RR	-	-	-	-	W-L Research
Yieldmaster RR	4	2	HR	HR	HR	HR	HR	HR	-	R	RR	-	H	-	-	Monsanto

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

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

‡ BW = Bacterial Wilt, PRR = Phytophthora Root Rot, AN = Anthracnose, VW = Verticillium Wilt, FW = Fusarium Wilt,

APH 1 = Aphanomyces race one, APH 2 = Aphanomyces race two, SN=Stem nematode, RR = Roundup Ready Alfalfa Variety, PLF = Potato leafhopper resistance,

Multi = Multifoliate leaf expression (H-High, M-Medium, L-Low), Salt = Salt tolerance (G = germination, F = Forage), Stand = Standability or lodging resistance.

Table 4. Long-term yield averages (dry matter tons/acre) from MSU Alfalfa Variety Trials seeded in East Lansing, Michigan from 2009 to 2016										
Variety	Marketer	Three-year average						2-yr avg 2015	1-yr total 2016	(Number) † % Vernal ††
		2009	2010	2011	2012	2013	2014			
----- dry matter tons/acre -----										
5312	check	5.83	6.06	-	-	-	-	-	-	(2)115
5454	check	6.26	-	-	-	-	-	-	-	(1)129
4S417	Mycogen Seeds	6.36	6.38	-	-	-	-	-	-	(2)123
6417	NEXGROW	-	6.36	-	-	-	-	-	-	(1)115
6422Q	NEXGROW	7.29	-	6.19	-	-	-	-	-	(2)130
6585Q	NEXGROW	-	-	-	-	6.13	-	-	-	(1)117
AlfaFour Supreme	CHS Seed	-	-	6.79	-	-	-	-	-	(1)120
AmeriStand 403T Plus	America's Alfalfa	6.08	-	-	-	-	-	-	-	(1)125
Ameristand 407TQ	America's Alfalfa	6.98	-	6.28	-	-	-	-	-	(2)127
Caliber	Becks Hybrids	-	-	-	-	-	5.81	4.10	-	(1)109
CavalryDQ	Becks Hybrids	-	-	-	-	-	-	4.82	-	(1)128
Chesapeake	AgReliant	6.79	-	-	-	-	-	-	-	(1)140
Contender	Becks Hybrids	-	-	-	6.21	-	5.80	4.47	-	(3)112
DG 4210	Crop Production	-	6.56	6.23	-	6.16	-	-	-	(3)115
DKA43-13	Dekalb	-	6.31	-	-	-	-	-	-	(1)114
DK140	check	6.06	-	-	-	-	-	-	-	(1)125
Everlast II	Legacy Seeds	6.06	-	-	-	-	-	-	-	(1)125
Enduro Elite	Cisco Seeds	-	-	-	-	-	5.73	-	-	(1)109
FF42.A2	Lacrosse Seeds	-	-	-	-	-	-	4.89	-	(1)130
Fierce	Becks Hybrids	-	-	-	-	-	5.86	4.80	-	(2)120
ForageGold	Renk Seed	6.39	-	-	5.79	-	-	-	-	(2)116
Fortune	DLF International	-	-	-	-	-	-	-	4.81	-
FSG 415 BR	Forage First	-	-	-	-	-	-	5.16	-	(1)138
FSG 403LR	Forage First	-	-	-	-	6.04	-	-	-	(1)115
FSG 424	Forage First	-	-	-	-	6.30	-	-	-	(1)120
FSG 426	Forage First	-	-	-	-	-	-	4.54	-	(1)121
GA 409	Preferred Alfalfa Gen	-	-	-	-	-	5.79	-	-	(1)110
GA-497HD	Preferred Alfalfa Gen	-	-	-	-	-	-	-	5.03	-
Gunner	Croplan Genetics	-	-	5.83	-	-	-	-	-	(1)103
HybriForce 2400	Dairyland Seed	6.68	6.27	-	-	-	-	-	-	(2)125
HybriForce 3400	Dairyland Seed	-	-	6.50	7.00	6.43	-	4.52	-	(3)119
HybriForce 3400 QR	Dairyland Seed	-	-	-	6.63	-	-	-	-	(1)114
HybriForce 3420	Dairyland Seed	-	-	-	-	-	-	-	5.16	-
HybriForce 3420/Wet-OB1	Osprey Biotechnics	-	-	-	-	-	-	-	5.05	-
HybriForce 3420/Wet-OB2	Osprey Biotechnics	-	-	-	-	-	-	-	5.45	-
HybriForce 3430	Dairyland Seed	-	-	-	-	-	-	-	5.10	-
HybriPro BR	Hyland Seeds	-	-	-	-	-	5.68	-	-	(1)108
Integra 8420	Wilbur-Ellis	-	-	-	-	-	-	-	5.18	-
Integra 8450	Wilbur-Ellis	-	-	-	-	-	-	-	5.28	-
KingFisher 243	Byron Seed	6.20	-	-	-	-	-	-	-	(1)128
KingFisher 4020	Byron Seed	-	6.32	-	-	-	-	-	-	(1)114
KF406A2	Byron Seed	-	-	-	-	-	-	-	4.94	-
KF425HD	Byron Seed	-	-	-	-	-	-	-	5.25	-
L455HD	Legacy Seeds	-	-	-	-	5.98	-	-	-	(1)114
LegenDairy 5.0	Croplan Genetics	6.64	-	6.12	-	-	-	-	-	(2)122
LegenDairy XHD	Croplan Genetics	-	-	-	-	6.20	-	-	-	(1)119
Magnitude	Allied Seed	-	-	-	6.49	-	-	-	-	(1)112
Mariner IV	Allied Seed	-	-	-	6.31	-	-	-	-	(1)109
Oneida VR	public	5.42	-	5.56	-	5.53	5.33	-	4.16	(4)104
PGI 529	Alforex	-	-	-	-	6.66	-	-	-	(1)127
PGI 557	Alforex	-	-	6.11	-	-	-	-	-	(1)108
Pioneer 53H92	Pioneer	6.13	-	-	-	-	-	-	-	(1)126
Pioneer 54Q14	Pioneer	-	-	-	-	-	5.54	-	-	(1)106
Pioneer 54Q32	Pioneer	6.50	-	6.03	-	-	-	-	-	(2)120
Pioneer 54QR04	Pioneer	-	-	-	-	5.95	-	-	-	(1)114
Pioneer 55Q27	Pioneer	-	-	-	-	6.38	6.13	4.78	4.94	(3)122
Pioneer 55V12	Pioneer	6.78	-	6.23	6.08	-	-	-	-	(3)118
Pioneer 55V48	Pioneer	7.28	-	-	-	-	-	-	-	(1)150
Pioneer 55V50	Pioneer	-	-	6.85	6.95	6.59	-	-	-	(3)122
Prolific II	Hyland Seeds	-	-	6.54	-	-	5.64	-	-	(2)111
PLH-resistant	check	-	5.59	5.79	-	-	-	-	-	(2)102
Radiance HD	Legacy Seeds	6.91	-	-	-	-	-	-	-	(1)142
Rebound 6.0	Croplan Genetics	-	-	6.01	-	-	-	-	-	(1)106
Rebound 6XT	Croplan Genetics	-	-	-	-	-	-	-	4.66	-
SolarGold	Renk Seed	-	-	6.39	6.31	-	-	-	-	(2)111
Sonic	Nutech Seed	-	-	6.21	-	-	-	-	-	(1)110
Stalwart II	Great Lakes Hybrids	-	-	-	-	-	-	-	4.70	-
StarGold	Renk Seed	-	-	-	-	-	6.17	-	-	(1)118
Velocity	Nutech Seed	6.10	-	-	-	-	-	-	-	(1)126
Vernal	public	4.85	5.53	5.67	5.80	5.23	5.25	3.75	3.84	(7)100
WL343HQ	W-L Research	-	5.81	-	-	-	-	-	-	(1)105
WL354HQ	W-L Research	-	-	5.97	-	-	-	-	-	(1)105
WL363HQ	W-L Research	6.84	6.26	-	-	-	-	-	-	(2)127
WL365HQ	W-L Research	-	-	-	-	-	-	-	4.99	-
Mean		6.38	6.13	6.17	6.36	6.12	5.73	4.58	4.91	118
† 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 2009 to 2016.

Three-year average								2-yr	1-yr	(Number) †
Variety	Marketer	2009	2010	2011	2012	2013	2014	avg	total	% Vernal ††
----- dry matter tons/acre -----										
5312	check	-	4.69	4.72	-	-	-	-	-	(2)106
6417	NEXGROW	-	4.90	-	-	-	-	-	-	(1)114
4A415	Mycogen Seeds	-	5.19	-	-	-	-	-	-	(1)120
4S417	Mycogen Seeds	3.84	5.18	-	-	-	-	-	-	(2)117
6305Q	NEXGROW	-	4.91	-	-	-	-	-	-	(1)114
6422Q	NEXGROW	3.99	-	-	-	-	-	-	-	(1)119
AmeriStand 403T Plus	America's Alfalfa	3.48	-	-	-	-	3.18	4.35	-	(3) 99
AmeriStand 407TQ	America's Alfalfa	3.81	-	4.65	-	-	-	-	-	(2)107
Chesapeake	AgReliant	3.81	-	-	-	-	-	-	-	(1)113
DK140	check	3.46	-	-	-	-	-	-	-	(1)103
DG 3210	Crop Production	-	4.62	-	-	-	-	-	-	(1)107
DG 4210	Crop Production	-	4.87	4.63	-	2.58	3.35	4.46	-	(5)103
DKA43-13	Dekalb	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	-	3.65	4.73	-	(3)107
Hi-Gest 360	Alforex	-	-	-	-	-	3.40	-	-	(1) 97
Integra 8420	Wilbur-Ellis	-	-	-	-	-	-	-	3.45	-
Integra 8450	Wilbur-Ellis	-	-	-	-	-	-	-	3.42	-
L455HD	Legacy Seeds	-	-	-	-	2.77	3.83	4.33	-	(3)107
LegenDairy 5.0	Croplan Genetics	4.11	-	-	-	-	-	-	-	(1)122
Magnum 7 WET	Dairyland Seed	-	-	-	-	-	3.62	4.37	-	(2)103
Mariner IV	Allied Seed	-	-	-	-	-	3.81	4.57	-	(2)108
Oneida VR	public	-	-	-	-	2.61	3.62	4.67	-	(3)105
Octane	Brett Young	-	-	-	-	-	3.46	-	-	(1) 99
Pioneer 54Q32	Pioneer	3.99	-	4.59	3.99	-	-	-	-	(3)105
Pioneer 54Q14	Pioneer	-	-	-	-	-	3.20	4.21	-	(2) 95
Pioneer 54QR04	Pioneer	-	-	-	-	2.56	-	-	-	(1)100
Pioneer 55H94	Pioneer	-	-	4.39	-	-	-	-	-	(1) 95
Pioneer 55Q27	Pioneer	-	-	-	-	2.59	3.81	4.30	3.34	(3)104
Pioneer 55V12	Pioneer	3.52	-	4.36	3.98	-	-	-	-	(3) 99
Pioneer 55V48	Pioneer	3.52	-	-	-	-	-	-	-	(1)105
Pioneer 55V50	Pioneer	-	-	4.80	4.09	2.73	3.79	4.65	-	(5)106
Prolific II	Hyland Seed	-	-	-	-	-	3.81	4.56	-	(2)108
PLH-resistant	check	3.68	4.52	4.16	-	-	-	-	-	(3)102
SolarGold	Renk Seed	-	-	-	3.90	-	-	-	-	(1) 96
Sonic	Nutech Seed	-	-	4.52	-	-	-	-	-	(1) 98
StarGold	Renk Seed	-	-	-	-	-	3.48	-	-	(1)100
Velocity	Nutech Seed	3.95	-	-	-	-	-	-	-	(1)118
Vernal	public	3.36	4.31	4.61	4.08	2.55	3.49	4.25	3.66	(7)100
WL 354HQ	W-L Research	-	-	-	-	-	3.11	-	-	(1) 89
Mean		3.76	4.81	4.54	4.03	2.63	3.54	4.45	3.47	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.

3-year average						2-yr avg	(Number) †
Variety	Marketer	2008	2009	2012	2013	2015	% Vernal ††
----- dry matter tons/acre -----							
5312	check	-	3.27	-	3.53	-	(2)106
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	-	-	2.81	(2)105
Ameristand 407TQ	America's Alfalfa	3.45	2.96	-	-	-	(2)100
DG 4210	Crop Production	-	-	-	3.74	2.90	(2)107
DK140	check	3.40	3.01	-	-	-	(2)100
DKA 33-16	Dekalb	3.70	-	-	-	-	(1)106
DKA 43-13	Dekalb	-	3.23	-	-	-	(1)111
Evergreen 3	NEXGROW	3.23	-	-	-	-	(1) 92
ForageGold	Renk Seed	-	-	3.13	-	-	(1) 98
HybriForce 3400	Dairyland	-	-	-	-	2.99	(1)112
L455HD	Legacy	-	-	-	-	2.87	(1)107
Magnum 7 WET	Dairyland	-	-	-	-	2.78	(1)104
Mariner IV	Allied Seed	-	-	3.13	-	2.68	(1)100
Oneida VR	Public	-	-	-	-	2.71	(1)101
Pioneer 53H92	Pioneer	-	2.88	-	-	-	(1) 99
Pioneer 54Q32	Pioneer	-	3.28	-	-	-	(1)113
Pioneer 55Q27	Pioneer	-	-	-	-	2.89	(1)108
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	-	-	-	-	2.78	(1)104
SolarGold	Renk Seed	-	-	3.61	-	-	(1)113
StarGold	Renk Seed	-	-	-	-	2.86	(1)107
Velocity	Nutech Seed	3.55	3.05	-	-	-	(2)103
Vernal	Public	3.50	2.90	3.19	3.53	2.68	(5)100
WL343HQ	W-L Research	3.55	-	-	-	-	(1)101
WL354HQ	W-L Research	-	-	-	-	2.66	(1) 99
Mean		3.52	3.08	3.32	3.62	2.80	104

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

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



Table 7. Yields of Roundup Ready Alfalfa Varieties (dry matter tons/acre) seeded from 2013 to 2016 at East Lansing, Lake City, and Chatham, Michigan .

East Lansing										Lake City						Chatham									
Variety	Marketer	2013 †		2014 ††		2015 †		2016 †		(Number)		3-year avg	3-year avg	2-year avg	1-year Total	% Mean ‡	3-year avg	2-year avg	1-year Total	% Mean ‡	3-year avg	2-year avg	1-year Total	% Mean ‡	
		3-year avg	3-year avg	3-year avg	3-year avg	2-year avg	1-year Total	% Mean ‡	3-year avg	3-year avg	2-year avg														1-year Total
		----- dm tons/acre -----																							
428RR	Allied Seed	6.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
430RRLH	Allied Seed	-	-	-	4.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6497R	NEXGROW	5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9200RR	Great Lakes Hybrids	-	-	-	-	-	4.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AmeriStand 455TQ RR	America's Alfalfa	5.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DKA40-51RR	Dekalb	-	5.10	4.68	4.24	4.24	(2)100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DKA41-18RR	Dekalb	5.72	-	-	-	-	(1)97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DKA43-22RR	Dekalb	-	5.20	-	-	-	(1)102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DKA44-16RR	Dekalb	5.99	5.24	4.41	4.69	4.69	(3)100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Integra 8444R	Wilbur-Ellis	-	-	-	-	4.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pioneer 54QR04	Pioneer	5.98	-	-	-	-	(1)102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pioneer VR06	Pioneer	-	5.40	5.02	-	-	(2)107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pioneer 55VR08	Pioneer	-	-	-	-	4.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RR AphaTron 2XT	Croplan Genetics	-	-	-	-	4.56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RR 501	Channel	-	5.26	-	-	-	(1)100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean		5.89	5.24	4.55	4.47																				

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

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

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

Table 8. Long-term average yields (dry matter tons/acre) of perennial forage grasses seeded from 2006 to 2015 and 1-year total from 2016 at East Lansing, Michigan.

Sp †	Variety	Marketer	Three-year average						2-yr	1-yr	% species
			2006	2007	2009	2011	2013	2014	avg	total	
----- dry matter tons/acre -----											
FEST	SpringGreen(organic)	Rose Agri-Seed Inc.	-	2.68	-	-	-	-	-	-	(1) 107
FEST	Becva (ryegrass type)	DLF International Seed	-	-	-	-	-	2.61	-	-	(1) 106
FEST	Barfest (ryegrass type)	Barenbrug Seed	-	-	-	-	-	2.33	-	-	(1) 94
FEST	Fojtan (fescue type)	DLF Pickseed USA Inc	-	-	-	-	-	-	-	3.17	-
FEST	Gain	Allied Seed	-	2.34	-	-	-	-	-	-	(1) 93
FEST	Mahulena (fescue type)	DLF Pickseed USA Inc	-	-	-	-	-	-	-	3.66	-
FEST	SPECIES MEAN		-	2.51	-	-	-	2.47	-	3.42	
KB	Ginger	check	-	-	3.18	-	-	-	2.58	-	(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	-	-	-	-	-	3.42	-	-	(1) 100
OR	Bounty	Standish Milling	4.22	-	-	-	-	-	-	-	(1) 99
OR	Echelon	DLF Pickseed	-	-	-	3.79	-	3.43	-	4.69	(2) 99
OR	Elsie	Rose Agri-Seed Inc.	-	3.75	-	-	-	-	-	-	(1) 94
OR	Extend	Standish Milling	4.46	-	-	-	-	-	-	-	(1) 105
OR	FSG506OG	Allied Seed	-	-	-	-	-	3.46	-	-	(1) 101
OR	Harvestar	Columbia Seeds	4.22	-	-	-	-	-	-	-	(1) 99
OR	Inavale	DLF Pickseed USA Inc	-	-	-	3.79	-	-	-	-	(1) 98
OR	Intensiv	Barenbrug Seed	-	-	-	3.79	-	3.48	-	-	(2) 100
OR	Lyra	Hood River Seed	-	-	-	-	-	-	-	4.24	-
OR	Megabite	Rose Agri-Seed Inc.	-	4.09	-	-	-	-	-	-	(1) 103
OR	Persist	Smith Seed	-	-	3.58	4.12	-	3.37	-	-	(3) 102
OR	Potomac	check	-	4.15	3.49	3.83	-	3.28	3.09	4.24	(4) 100
OR	Treposno	Hood River Seed	-	-	-	-	-	-	-	4.19	-
OR	Warrior II	ProSeeds Marketing	-	3.95	-	-	-	-	-	-	(1) 99
OR	SPECIES MEAN		4.26	3.99	3.54	3.86	-	3.41	-	4.34	
PR	Albion (4n) ††	Cisco Seed	-	-	-	-	-	-	2.26	-	(1) 99
PR	BarSprinter (2n)	Barenbrug Seed	-	2.08	-	-	-	-	-	-	(1) 94
PR	Boost (2n)	Standish Milling	2.94	-	-	-	-	-	-	-	(1) 103
PR	Bison 2 (4n)	DLF Pickseed USA Inc	-	-	-	-	-	-	-	4.04	-
PR	Calibra (4n)	check	-	-	1.92	-	-	-	-	-	(1) 102
PR	Dexter 1 (4n)	DLF Pickseed USA Inc	-	-	-	-	-	-	-	3.09	-
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	Garbor (4n)	DLF Pickseed USA Inc	-	-	-	-	-	-	-	2.99	-
PR	Kentaur (4n)	DLF Pickseed USA Inc	-	-	-	2.72	-	-	-	-	(1) 108
PR	Korok (4n)	Czech Republic	-	2.12	-	-	-	-	-	-	(1) 96
PR	Linn (2n)	check	-	-	1.84	2.39	1.07	2.22	2.32	2.90	(5) 88
PR	Mathilda (4n)	DLF Pickseed USA Inc	-	-	-	2.50	-	-	-	-	(1) 99
PR	Mara (2n)	Barenbrug Seed	-	-	-	-	-	2.59	-	-	(1) 98
PR	Maximo (4n)	DLF Pickseed USA Inc	-	-	-	-	-	2.54	-	3.95	(1) 96
PR	Quartermaster (4n)	Lewis Seed	3.05	-	-	-	-	-	-	-	(1) 107
PR	Payday (4n)	Smith Seed	-	-	-	-	-	2.96	-	-	(1) 112
PR	Remington (4n)	Barenbrug Seed	-	2.78	-	2.81	-	2.88	-	-	(3) 115
PR	Verano (4n)	Columbia Seeds	2.59	-	-	-	-	-	-	-	(1) 91
PR	SPECIES MEAN		2.85	2.21	1.88	2.53	1.66	2.64	2.29	3.39	

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	2016	mean ‡§
----- dry matter tons/acre -----											
RC	Chiefton	check	3.61	-	-	-	-	-	-	-	(1) 96
RC	Marathon	Standish Milling	3.89	-	-	-	-	-	-	-	(1) 104
RC	SPECIES MEAN		3.75	-	-	-	-	-	-	-	
SB	Lincoln	Check variety	-	-	-	-	-	3.71	-	-	(1) 104
SB	Hakari (Alaska Brome)	Barenbrug Seed	-	-	-	-	-	3.33	-	-	(1) 93
SB	MBA	DLF Pickseed USA Inc	-	-	-	-	-	3.70	-	-	(1) 103
SB	SPECIES MEAN		-	-	-	-	-	3.58	-	-	
TF	BarElite	Barenbrug Seed	-	4.15	-	-	-	4.18	-	-	(2) 95
TF	Bariane	Barenbrug Seed	-	-	-	-	-	3.72	2.93	-	(2) 90
TF	Dominate	Allied Seed	-	-	-	-	-	4.50	-	-	(1) 106
TF	Cajun II	Smith Seed	-	-	-	-	-	4.21	-	-	(1) 99
TF	Cowgirl	Rose Agri-Seed Inc.	-	4.84	-	-	-	-	-	-	(1) 107
TF	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	-	-	-	-	-	4.33	-	-	(1) 102
TF	Goliath	Cisco Seed	-	-	4.06	-	-	-	-	-	(1) 101
TF	Hymark	Fraser Seeds	-	-	-	4.42	-	-	-	-	(1) 99
TF	Kentucky 31 plus	check	-	-	3.96	4.75	-	-	3.25	-	(3) 103
TF	Kentucky 31 minus	check	-	-	-	-	3.45	4.24	3.22	3.74	(3) 98
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 Pickseed USA Inc	-	-	-	-	-	4.61	-	3.65	(1) 108
TF	Verdant	Amer. Grass Seed Prod	3.87	-	-	-	-	-	-	-	(1) 94
TF	SPECIES MEAN		4.09	4.54	4.01	4.48	3.83	4.26	3.13	3.70	
MdF	Cosmonaut	Barenbrug Seed	-	-	-	-	-	3.25	-	-	(1) 98
MdF	Pradel	Barenbrug Seed	-	-	3.15	-	-	3.25	2.20	3.15	(2) 103
MdF	Preval	Ampac Seed Company	-	-	2.78	-	-	-	-	-	(1) 94
MdF	Raskila	Hood River Seed	-	-	-	-	-	-	-	3.54	-
MdF	SPECIES MEAN		-	-	2.97	-	-	3.25	-	3.35	
TM	BarPenta	Barenbrug Seed	-	3.94	-	-	-	-	-	-	(1) 101
TM	Climax	check	4.03	3.84	-	-	-	2.94	2.75	3.54	(3) 93
TM	Crest	Allied Seed	4.94	-	-	-	-	-	-	-	(1) 107
TM	Express II	Allied Seed	-	-	-	-	-	3.44	-	-	(1) 108
TM	Summit	Allied Seed	4.87	-	-	-	-	-	-	-	(1) 106
TM	Zenyatta	DLF Pickseed USA Inc	-	-	-	-	-	-	-	3.33	-
TM	SPECIES MEAN		4.61	3.89	-	-	-	3.19	2.75	3.44	

† FEST=Festulolium (Ryegrass or Fescue type), 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.

Sp †	Variety	Marketer	Lake City ‡				Chatham ‡		
			3-year average 2006	3-year average 2014	2-year average 2015	% species mean ‡‡	3-year average 2014	2-year average 2015	% species mean ‡‡
			---- dry matter tons/acre ----				dry matter tons/acre		
OR	Ambrosia	Amer. Grass Seed Prod	3.36	-	-	(1) 99	-	-	-
OR	Bounty	Standish Milling	3.61	-	-	(1) 107	-	-	-
OR	Echelon	DLF Pickseed USA Inc	-	3.20	-	(1) 103	1.54	-	(1) 96
OR	Extend	Standish Milling	3.37	-	-	(1) 100	-	-	-
OR	Harvestar	Columbia Seeds	3.18	-	-	(1) 94	-	-	-
OR	Intensiv	Barenbrug Seed	-	3.27	4.60	(2) 105	1.68	-	(1) 105
OR	Persist	Smith Seed	-	2.97	4.15	(2) 96	1.58	-	(1) 99
OR	Potomac	check variety	-	3.02	4.20	(2) 97	1.59	1.84	(1) 101
OR	SPECIES MEAN		3.38	3.12	4.32		1.57	1.84	
PR	Albion (4n)	Cisco Seeds	-	-	3.86	(1) 107	-	0.57	(1) 75
PR	Eurostar (2n)	Seed Research of OR	2.05	-	-	(1) 101	-	-	-
PR	Linn (2n)	check variety	-	-	-	-	-	0.99	(1) 130
PR	Mara (2n)	Barenbrug Seed	-	-	3.25	(1) 90	-	0.72	(1) 95
PR	Payday (4n)	Smith Seed	-	-	3.73	(1) 103	-	-	-
PR	Remington (4n)	Barenbrug Seed	-	-	-	-	-	0.75	(1) 99
PR	Verano (4n)	Columbia Seeds	2.01	-	-	(1) 99	-	-	-
PR	SPECIES MEAN		2.03	-	3.61		-	0.76	
RC	Chiefton	check variety	2.25	-	-	(1) 90	-	-	-
RC	Marathon	Standish Milling	2.76	-	-	(1) 110	-	-	-
RC	SPECIES MEAN		2.51	-	-		-	-	
TF	Bariane	Barenbrug Seed	-	2.79	5.05	(2) 98	1.53	1.43	(2) 85
TF	Enhance	Standish Milling	2.44	-	-	(1) 100	-	-	-
TF	Kentucky 31 Plus	check variety	-	3.08	4.83	(2) 100	1.89	1.80	(2) 105
TF	Kentucky 31 minus	check variety	-	2.98	4.99	(2) 100	1.82	-	(1) 101
TF	Kentucky 32	check variety	-	-	-	-	-	1.84	(1) 109
TF	Tuscany II	Forage First	-	3.11	4.89	(2) 102	1.98	-	(1) 109
TF	Verdant	Amer. Grass Seed Prod	2.44	-	-	(1) 100	-	-	-
TF	SPECIES MEAN		2.44	2.99	4.94		1.81	1.69	
TM	BarPenta	Barenbrug Seed	-	3.12	-	(1) 95	1.94	-	(1) 92
TM	Climax	check variety	2.14	2.92	5.04	(3) 92	2.03	1.68	(2) 98
TM	Crest	Allied Seed	2.44	3.65	-	(2) 107	2.19	-	(1) 104
TM	Summit	Allied Seed	2.55	3.46	5.12	(3) 104	2.33	-	(1) 110
TM	Winnetow	DLF Pickseed USA Inc	-	-	-	-	-	1.56	(1) 93
TM	Zenyatta	DLF Pickseed USA Inc	-	-	5.43	(1) 104	-	1.78	(1) 107
TM	SPECIES MEAN		2.38	3.29	5.20		2.12	1.67	
SB ††	Lincoln	check variety	-	-	4.62	-	-	-	-
MdF ††	Pradel	Barenbrug Seed	-	-	4.38	-	-	1.88	-

† SB=Smooth Brome grass, OR=Orchardgrass, PR=Perennial ryegrass, RC=Reed canarygrass, TF= Tall fescue,

MdF= Meadow fescue, TM=Timothy

†† Only one commercially available variety of Smooth Brome grass and Meadow Fescue tested.

‡ Generally, three cuttings per year at Lake City. Two cuttings per year at Chatham for Orchardgrass, Tall fescue, Brome grass and one cutting per year for Perennial Ryegrass and Timothy.

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

Table 10. Michigan State University Grass Maturity Dates in First Cutting of 2017 in the Perennial Grass Variety Trials at East Lansing, Lake City and Chatham.

Fescue							
Tall, Meadow, Festulolium Variety	Trial Seeding Year and Location						
	2014			2015			2016
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham	East Lansing
BAR FA 13131 †	-	-	-	-	May 31	-	-
BarElite	May 22	-	-	-	-	-	-
Barfest (Fest)	May 27	-	-	-	-	-	-
Bariane	May 26	June 6	Boot	Veg	June 6	Boot	-
BAR FPF 32 (Meadow) †	-	-	-	-	June 3	-	-
Becva (Fest)	May 27	-	-	-	-	-	-
Cajun II	May 15	-	-	-	-	-	-
Cosmonaut (Meadow)	May 23	-	-	-	-	-	-
Dominate	May 15	-	-	-	-	-	-
Fojtan (Fest)	-	-	-	-	-	-	May 18
FSG 402TF ††	May 17	-	-	-	-	-	-
FTF 70 †	-	-	-	-	-	-	May 18
FTF 73 †	-	-	-	-	-	-	May 19
FTF 96 †	-	-	-	-	-	-	May 18
Kentucky 31 Minus	May 17	June 1	June 14	May 16	May 30	-	May 17
Kentucky 31 Plus	-	June 2	June 14	May 17	May 31	June 15	-
Kentucky 32	-	-	-	-	-	June 15	-
Mahulena (Fest)	-	-	-	-	-	-	May 14
MT 9301 †	May 22	-	-	-	-	-	-
Pradel (Meadow)	May 24	-	-	Veg	June 2	June 12	Veg
Raskila (Meadow)	-	-	-	-	-	-	Veg
TF0705SL †	May 17	-	-	-	-	-	-
Tower	May 23	-	-	-	-	-	May 22
Tuscany II	-	June 1	June 14	-	June 1	-	-
Harvest Dates	May 27	June 6	June 16	May 19	June 6	June 16	May 19
Perennial Ryegrass							
Variety	Trial Seeding Year and Location						
	2014			2015			2016
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham	East Lansing
AGRLP-156 †	May 26	-	-	-	-	-	-
AGRLP-157 †	Veg	-	-	-	-	-	-
Albion	-	-	-	Veg	Veg	Boot	-
Bison 2	-	-	-	-	-	-	Veg
Dexter 1	-	-	-	-	-	-	Veg
Garbor	-	-	-	-	-	-	Veg
DLFPS-LHT7 †	May 27	-	-	-	-	-	-
Linn	May 23	-	-	May 19	-	June 14	May 17
Mara	Veg	-	-	-	June 6	Boot	-
Maximo (Int)	May 27	-	-	-	-	-	Veg
Payday	May 27	-	-	-	June 5	-	-
Remington	Veg	-	-	-	-	Boot	-
Harvest Dates	May 27	-	-	May 19	June 6	June 22	May 19
Bromegrass							
Smooth, Meadow, Alaska Variety	Trial Seeding Year and Location						
	2014			2015			2016
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham	East Lansing
BAR BcF 1FFRL (MB) †	May 16	-	-	-	-	-	-
BAR BiF 1GRL †	May 22	-	-	-	-	-	-
GO-SBF †	-	-	-	May 19	June 1	June 8	-
Hakari (Alaska)	May 27	-	-	-	-	-	-
Lincoln	May 22	-	-	Veg	June 6	Early Head	-
MBA	May 17	-	-	-	-	-	-
Harvest Dates	May 27	-	-	May 19	June 6	June 8	-

Table 10 continued next page

Table 10 continued

Orchardgrass							
Trial Seeding Year and Location							
Variety	2014			2015			2016
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham	East Lansing
Barlegro	Veg	-	-	-	-	-	-
Echelon	Veg	June 1	June 12	-	-	-	May 19
FSG 506OG ††	May 18	-	-	-	-	-	-
GO-BXCR †	-	-	-	May 19	May 30	June 9	-
GO-MOSO †	-	-	-	May 18	May 30	June 10	-
Intensiv	Veg	June 2	June 12	-	June 1	-	-
Lyra	-	-	-	-	-	-	May 18
OG 0707 †	-	-	-	May 17	-	-	-
Persist	May 15	May 30	June 5	-	May 30	-	-
Potomac	May 17	May 31	June 5	May 15	May 29	June 7	May 15
Treposno	-	-	-	-	-	-	May 17
Harvest Dates	May 19	June 6	June 16	May 19	June 6	June 16	May 19
Timothy							
Trial Seeding Year and Location							
Variety	2014			2015			2016
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham	East Lansing
Barpenta	-	Veg	Veg	-	-	-	-
Climax	Veg	Veg	Boot	Veg	Veg	Early Head	Veg
Crest	-	June 5	June 22	-	-	-	-
Express II ††	Veg	-	-	-	-	-	-
GO-120X †	-	-	-	Veg	June 5	Early Head	-
TM704 †	-	-	-	-	-	-	Veg
TM 0801 †	May 23	-	-	-	-	-	-
Summit	-	June 2	June 22	-	June 2	-	-
Winnetow	-	-	-	-	-	Early Head	-
Zenyatta	-	-	-	-	June 2	June 22	Veg
Harvest Dates	May 27	June 6	June 22	May 19	June 6	June 22	May 19
Kentucky Bluegrass							
Trial Seeding Year and Location							
Variety	2014			2015			2016
	East Lansing	Lake City	Chatham	East Lansing	Lake City	Chatham	East Lansing
Ginger	-	-	-	May 10	-	May 30	-
GO-13NF †	-	-	-	May 16	-	June 5	-
Harvest Dates	-	-	-	May 19	-	June 8	-
† Experimental Variety not commercially available							
†† Variety entered as an experimental that is now commercially available							
Veg - Varieties still in the vegetative stage on the date of first cutting							
Boot - Varieties in the boot stage on the date of first cutting							
Early Head - Varieties in the early heading stage on the date of first cutting							



Table 11. 2017 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2014.

Variety	2017 - Five cuts and Total						2016	2015	3-Year
	May 23	June 20	July 20	Aug 25	Oct 20	Total	Total	Total	Total
StarGold ††	1.62	1.10	1.03	0.94	0.79	5.48*	7.68*	5.35*	18.51*
Pioneer 55Q27	1.59	1.00	0.98	0.81	0.63	5.03*	7.75*	5.62*	18.40*
AFXH 134089 †	1.63	0.94	0.96	0.88	0.64	5.05*	7.24*	5.79*	18.08*
Fierce	1.44	0.92	0.90	0.85	0.68	4.80	7.25*	5.52*	17.57*
Caliber	1.41	0.93	0.98	0.84	0.63	4.78	6.99	5.65*	17.42*
Contender	1.44	0.90	0.95	0.85	0.63	4.77	7.02	5.62*	17.41*
GA 409	1.61	0.92	0.92	0.82	0.56	4.83	7.30*	5.24	17.37*
Enduro Elite	1.55	0.93	0.94	0.81	0.58	4.81	6.96	5.41*	17.18
HybriPro BR	1.44	0.86	0.90	0.80	0.55	4.55	7.01	5.48*	17.04
Prolific II	1.39	0.81	0.91	0.80	0.52	4.43	6.73	5.77*	16.93
Pioneer 54Q14	1.40	0.88	0.90	0.75	0.49	4.42	6.66	5.55*	16.63
Oneida VR	1.39	0.83	0.80	0.72	0.50	4.24	6.39	5.37*	16.00
Vernal	1.31	0.78	0.87	0.77	0.53	4.26	6.44	5.05	15.75
Average	1.47	0.90	0.92	0.82	0.59	4.70	6.99	5.46	17.15
LSD 0.05	0.19	0.13	0.12	0.13	0.12	0.55	0.60	0.44	1.29
CV %	7.7	8.4	8.0	9.2	12.5	6.9	5.1	4.8	4.5

† Experimental Variety †† Released variety seeded as an experimental

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

Table 12. 2017 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2014.

Variety	2017 - Five cuts and Total						2016	2015	3-Year
	May 23	June 20	July 20	Aug 25	Oct 20	Total	Total	Total	Total
Pioneer 55VR06	1.43	0.94	1.04	0.83	0.58	4.81*	6.70	4.68	16.19
RR 501	1.32	0.94	1.06	0.87	0.59	4.78*	6.39	4.62	15.79
DKA 44-16RR	1.41	0.93	1.01	0.80	0.55	4.71*	6.45	4.57	15.73
DKA 43-22RR	1.43	0.86	0.96	0.76	0.55	4.56*	6.46	4.59	15.61
DKA 40-51RR	1.36	0.88	0.99	0.74	0.42	4.40	6.46	4.45	15.31
Average	1.39	0.91	1.01	0.80	0.54	4.65	6.49	4.58	15.70
LSD 0.05	0.13	0.17	0.12	0.06	0.06	0.35	0.47 ns	0.81 ns	1.46 ns
CV %	5.3	9.5	6.6	4.5	5.7	4.0	3.8	9.3	4.9

* 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. 2017 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2015.

Variety	2017 - Four cuts and Total					2016 Total	2-Year Total
	May 30	June 27	July 26	Sep 9	Total		
FSG415BR	1.89	1.04	1.06	0.48	4.48*	5.83*	10.31*
msSunstra-144142 †	1.95	1.06	0.96	0.45	4.42*	5.69*	10.11*
msSunstra-145154 †	1.98	1.09	0.98	0.45	4.51*	5.40*	9.91*
msSunstra-144131 †	1.89	1.01	0.95	0.43	4.29*	5.56*	9.85*
FF42.A2	1.83	1.12	1.03	0.52	4.49*	5.28	9.77*
CavalryDQ ††	1.82	1.09	1.03	0.50	4.44*	5.26	9.70*
Fierce	1.73	0.96	0.94	0.50	4.14*	5.45*	9.59*
msSunstra-144110 †	1.88	0.99	0.88	0.39	4.14*	5.43*	9.57*
Pioneer 55Q27	1.87	1.06	0.97	0.46	4.36*	5.20	9.56*
msSunstra-145159 †	1.82	0.94	0.84	0.36	3.96*	5.41*	9.37*
FSG426	1.73	1.05	0.94	0.42	4.15*	4.93	9.08
HybriForce 3400	1.86	0.88	0.80	0.35	3.88	5.16	9.04
Contender	1.76	0.89	0.83	0.38	3.87	5.06	8.93
CW 054004 †	1.64	0.98	0.92	0.45	3.99*	4.71	8.70
Caliber	1.65	0.85	0.82	0.37	3.69	4.51	8.20
Vernal	1.46	0.68	0.68	0.24	3.07	4.42	7.49
Trial Average	1.78	0.98	0.91	0.43	4.12	5.20	9.32
LSD 0.05	0.19	0.20	0.17	0.13	0.55	0.53	1.01
CV %	9.3	17.4	16.3	24.9	11.7	8.9	9.5
† Experimental Variety †† Released variety seeded as an experimental.							
* Yield is not statistically different from the greatest value in the column.							

Table 14. 2017 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2015.

Variety	2017 - Four cuts and Total					2016 Total	2-Year Total
	May 30	June 27	July 26	Sep 9	Total		
Pioneer 55VR06	1.97	1.14	0.94	0.44	4.49*	5.55*	10.04*
DKA 40-51RR	1.72	0.99	0.86	0.43	4.00*	5.35*	9.35*
DKA 44-16RR	1.68	0.96	0.78	0.36	3.78	5.04*	8.82
430RRLH	1.48	0.76	0.76	0.37	3.36	4.81	8.17
Average	1.71	0.96	0.83	0.40	3.91	5.19	9.10
LSD 0.05	0.17	0.19	0.18	0.14	0.56	0.65	1.16
CV %	7.9	15.7	17.6	28.5	11.7	10.1	10.4
* Yield is not statistically different from the greatest value in the column.							

Table 15. 2017 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2016.

Variety	2017 - Four cuts and Total					2016 Seeding
	May 29	June 26	July 24	Sep 8	Total	Year
LS1302 †	2.47	1.30	1.24	0.65	5.66*	1.86
HybriForce-3420/Wet-OB2 ††	2.49	1.31	1.13	0.52	5.45*	2.09*
Integra 8450	2.44	1.21	1.12	0.51	5.28*	2.12*
KF425HD	2.34	1.26	1.10	0.55	5.25*	1.79
Integra 8420	2.32	1.21	1.10	0.56	5.18*	1.93
SW1412Y †	2.51	1.15	1.05	0.46	5.18*	1.88
HybriForce-3420 ††	2.54	1.13	1.00	0.49	5.16*	1.98
HybriForce-3430 ††	2.64	1.10	0.97	0.40	5.10*	2.19*
HybriForce-3420/Wet-OB1 ††	2.45	1.11	0.99	0.50	5.05*	1.94
SW5213 †	2.46	1.06	1.00	0.52	5.04*	1.72
GA-497HD	2.27	1.15	1.06	0.56	5.03*	1.77
WL365HQ	2.21	1.18	1.10	0.50	4.99*	1.58
msSunstra-143146 †	2.61	1.02	0.96	0.40	4.98*	2.13*
SW5210 †	2.47	1.04	0.98	0.49	4.97*	1.79
KF406A2	2.40	1.11	1.01	0.41	4.94*	1.97
Pioneer 55Q27	2.50	1.05	1.00	0.38	4.94*	1.93
msSunstra-144110 †	2.51	1.07	0.96	0.39	4.93*	2.15*
Fortune	2.53	1.00	0.94	0.35	4.81*	1.86
LS1401 †	2.51	0.96	0.85	0.41	4.74*	2.00
Stalwart II	2.33	1.03	0.91	0.42	4.70*	1.86
SW1314Y †	2.48	0.93	0.88	0.40	4.69*	1.84
Rebound 6XT	2.20	1.03	0.98	0.45	4.66	1.78
Oneida VR	2.27	0.82	0.77	0.29	4.16	1.84
Vernal	2.20	0.75	0.72	0.17	3.84	1.96
Average	2.42	1.08	0.99	0.45	4.95	1.92
LSD 0.05	0.15	0.32	0.32	0.27	0.97	0.17
CV %	4.3	21.3	23.2	43.0	13.9	6.3

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

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

Table 16. 2017 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2016.

Variety	2017 - Four cuts and Total					2016 Seeding
	May 29	June 26	July 24	Sep 8	Total	Year
DKA44-16RR	2.13	1.03	1.07	0.47	4.69	1.55
RR AphaTron 2XT	2.11	1.00	1.05	0.40	4.56	1.54
9200RR	2.15	1.00	1.03	0.37	4.55	1.58
Pioneer 55VR08	2.24	0.97	0.97	0.37	4.55	1.63
Integra 8444R	2.04	0.93	0.97	0.31	4.24	1.61
DKA40-51RR	2.19	0.87	0.92	0.27	4.24	1.54
Average	2.14	0.97	1.00	0.37	4.47	1.58
LSD 0.05	0.13	0.14	0.15	0.17	0.51 ns	0.11 ns
CV %	4.3	11.3	11.6	34.6	8.6	4.30

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

Table 17. 2017 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2014.

Variety	2017 - Three Cuts and Total				2016	2015	3-Year
	June 6	July 11	Sep 1	Total	Total	Total	Total
L 455HD	1.15	1.67	1.14	3.96*	3.60*	3.92	11.48
Mariner IV	1.20	1.68	1.15	4.03*	3.46*	3.95	11.44
Prolific II	1.16	1.65	1.20	4.01*	3.33*	4.09	11.43
Pioneer 55Q27	1.24	1.73	1.22	4.20*	3.41*	3.81	11.42
Pioneer 55V50	1.09	1.63	1.25	3.96*	3.33*	4.09	11.38
HybriForce 3400	0.85	1.80	1.35	3.99*	3.02*	3.93	10.94
Oneida VR	1.09	1.52	1.09	3.70*	3.17*	3.99	10.86
Magnum 7 Wet	0.95	1.60	1.19	3.75*	3.14*	3.96	10.85
Vernal	0.91	1.54	1.15	3.59	2.96*	3.91	10.46
StarGold ††	0.82	1.64	1.33	3.80*	3.05*	3.60	10.45
Octane ††	0.92	1.65	1.17	3.74*	2.96*	3.68	10.38
Hi-Gest 360 ††	1.06	1.63	1.08	3.76*	2.90*	3.53	10.19
DG 4210	0.94	1.66	1.14	3.74*	2.87*	3.45	10.06
Pioneer 54Q14	0.91	1.56	1.06	3.53	2.72*	3.35	9.60
Ameristand 403T Plus	0.86	1.52	1.00	3.39	2.63*	3.51	9.53
WL 354HQ	0.75	1.52	1.10	3.38	2.43	3.53	9.34
Average	0.99	1.63	1.16	3.78	3.06	3.77	10.62
LSD 0.05	0.56	0.11	0.17	0.58	1.06	0.98 ns	2.21 ns
CV %	39.4	4.8	10.7	10.8	24.2	18.3	14.6

†† 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 18. 2017 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2014.

Variety	2017 - Three Cuts and Total				2016	2015	3-Year
	June 6	July 11	Sep 1	Total	Total	Total	Total
DKA43-22RR	0.74	1.44	1.02	3.21	2.78	3.32	9.31
DKA44-16RR	0.74	1.44	0.97	3.15	2.73	3.23	9.11
DKA40-51RR	0.71	1.50	0.93	3.14	2.51	3.00	8.65
Average	0.73	1.46	0.98	3.17	2.68	3.18	9.03
LSD 0.05	0.27	0.20	0.15	0.39 ns	0.85 ns	0.67 ns	1.61 ns
CV %	21.0	7.7	9.1	7.1	18.4	12.2	10.3

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

Table 19. 2017 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2015.

Variety	2017 - Three Cuts and Total				2016 Total	2-Year Total
	June 6	July 14	Sep 1	Total		
Hybriforce 3400	2.03	1.43	1.00	4.47	4.99*	9.46
Oneida VR	2.07	1.37	1.06	4.49	4.85*	9.34
Pioneer 55V50	1.96	1.44	1.08	4.48	4.82*	9.30
Mariner IV	1.91	1.45	1.16	4.52	4.62*	9.14
Prolific II	1.94	1.40	1.11	4.45	4.67*	9.12
DG4210	1.88	1.51	1.07	4.46	4.46*	8.92
Magnum 7 Wet	1.84	1.34	0.97	4.15	4.59*	8.74
Ameristand 403T Plus	1.84	1.37	0.99	4.20	4.50*	8.70
L455HD	1.89	1.41	1.00	4.30	4.35	8.65
Pioneer 55Q27	1.76	1.35	1.07	4.18	4.41	8.59
Vernal	1.85	1.25	0.87	3.97	4.52*	8.49
Pioneer 54Q14	1.91	1.31	0.91	4.13	4.29	8.42
Average	1.91	1.39	1.02	4.32	4.59	8.91
LSD 0.05	0.33	0.31	0.21	0.81 ns	0.54	1.29 ns
CV%	12.1	15.5	14.5	13.0	8.2	10.1
ns - Total yield among varieties in this column are not statistically different						
* Yield is not statistically different from the greatest value in the column.						

Table 20. 2017 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2015.

Variety	2017 - Three Cuts and Total				2016 Total	2-year Total
	June 6	July 14	Sep 1	Total		
DKA 43-22RR	1.71	1.04	0.81	3.56	4.20	7.76
DKA 41-18RR	1.57	1.03	0.76	3.36	3.92	7.28
DKA 44-16RR	1.59	1.00	0.72	3.31	3.79	7.10
Pioneer 55VR06	1.54	0.99	0.69	3.23	3.86	7.09
DKA 40-51RR	1.39	0.87	0.62	2.87	3.77	6.64
Average	1.56	0.99	0.72	3.27	3.91	7.17
LSD 0.05	0.33	0.24	0.24	0.80 ns	0.56 ns	1.33 ns
CV%	13.8	15.9	21.6	15.9	9.3	12.1
ns - Total yield among varieties in this column are not statistically different						

Table 21. 2017 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2016.

Variety	2017 - Three cuts and Total			
	June 6	July 11	Sep 1	Total
Vernal	1.76	1.31	0.58	3.66
Integra 8420	1.61	1.20	0.64	3.45
Integra 8450	1.60	1.22	0.60	3.42
Pioneer 55Q27	1.58	1.18	0.58	3.34
Average	1.64	1.23	0.60	3.47
LSD 0.05	0.14	0.13	0.16	0.34 ns
CV %	5.6	6.7	16.3	6.2
ns - Total yield among varieties in this column are not statistically different				

Table 22. 2017 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Lake City, Michigan in July 2016.

Variety	2017 - Three cuts and Total			
	June 6	July 11	Sep 1	Total
DKA44-16RR	1.56	1.19	0.58	3.34
Pioneer 55VR08	1.57	1.15	0.57	3.30
DKA40-51RR	1.50	1.15	0.50	3.15
Integra 8444R	1.44	1.06	0.49	3.00
Average	1.52	1.14	0.54	3.20
LSD 0.05	0.18	0.10	0.17	0.34 ns
CV %	7.4	5.4	19.9	6.7
ns - Total yield among varieties in this column are not statistically different				



Table 23. 2017 Yield summary (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial Seeded in Chatham, Michigan in August 2015.

Variety	2017 - Three cuts and Total				2016 Total	2-Year Total
	June 22	Aug 2	Oct 4	Total		
Hybriforce 3400	1.58	0.78	0.32	2.68	3.29*	5.97
DG 4210	1.59	0.82	0.37	2.78	3.02*	5.80
Pioneer 55Q27	1.49	0.75	0.37	2.61	3.18*	5.78
L455 HD	1.49	0.82	0.32	2.63	3.11*	5.74
StarGold ++	1.45	0.81	0.39	2.65	3.06*	5.72
Ameristand 403T plus	1.62	0.75	0.31	2.68	2.91	5.61
Magnum 7	1.61	0.69	0.29	2.59	2.97*	5.56
Prolific II	1.47	0.67	0.33	2.47	3.09*	5.55
Oneida VR	1.60	0.68	0.29	2.57	2.85	5.41
Mariner IV	1.52	0.69	0.30	2.50	2.85	5.35
Vernal	1.63	0.68	0.26	2.58	2.77	5.35
WL 354HQ	1.50	0.67	0.28	2.45	2.86	5.32
Average	1.55	0.73	0.32	2.60	3.00	5.60
LSD 0.05	0.24	0.15	0.10	0.43 ns	0.36	0.74 ns
CV %	11.1	14.2	21.4	11.5	8.3	9.1

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

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

Table 24. 2017 Yield summary (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial Seeded in Chatham, Michigan in August 2015.

Variety	2017 - Three cuts and Total				2016 Total	2-Year Total
	June 22	Aug 2	Oct 4	Total		
DKA 44-16 RR	1.55	0.67	0.27	2.49	3.12	5.61
DKA 41-18 RR	1.40	0.71	0.31	2.42	3.16	5.59
DKA 43-22 RR	1.34	0.74	0.31	2.39	3.12	5.51
RR-501	1.33	0.61	0.26	2.21	3.09	5.30
DKA 40-51 RR	1.27	0.60	0.25	2.12	2.91	5.03
Average	1.38	0.67	0.28	2.33	3.08	5.41
LSD 0.05	0.19	0.21	0.11	0.37 ns	0.32 ns	0.63 ns
CV %	9.1	19.8	25.7	10.3	6.8	7.6

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



Tables 25, 26, and 27. Seeding-year yields of Alfalfa and Red Clover seeded in East Lansing in May 2017.

Table 25. 2017 Seeding-year yields (DM tons/acre) of the MSU Conventional Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2017.

Variety	2017 - Two cuts and Total		
	Cut 1 July 26	Cut 2 Oct 18	2017 Total
Fierce	1.26	0.29	1.56
msSunstra-144110 †	1.20	0.36	1.56
Vernal	1.23	0.33	1.56
Calvary DQ	1.18	0.31	1.49
msSunstra-164106 †	1.18	0.30	1.48
SW4107	1.15	0.32	1.47
AFX 429	1.11	0.31	1.43
AFX 469	1.13	0.28	1.40
CW A113005 †	1.07	0.31	1.38
CW 104014 †	1.02	0.21	1.23
Average	1.15	0.30	1.46
LSD 0.05	0.15	0.09	0.21
CV %	9.1	21.4	10.1

† Experimental Variety

Table 27. 2017 Seeding-year yields (DM tons/acre) of the MSU Red Clover Variety Trial Seeded in East Lansing, Michigan in May 2017.

Entry	Cut 2 - Aug 23, 2017
RC0705 †	1.31
Redkin	1.14
LS9703 †	1.08
Evolve	1.08
Common	0.94
Average	1.11
LSD 0.05	0.18
CV %	13.8

† Experimental Variety

Notes - Two cuts in 2017, (July 1 and Aug 23). Data reported for one weed-free harvest on Aug 23.

Table 26. 2017 Seeding-year yields (DM tons/acre) of the MSU Roundup Ready Alfalfa Variety Trial Seeded in East Lansing, Michigan in May 2017.

Variety	2017 - Two-cuts and Total		
	Cut 1 July 26	Cut 2 Oct 18	2017 Total
Armour (RR)	0.78	0.32	1.11
6424R	0.80	0.28	1.08
DKA 44-16 RR	0.80	0.26	1.06
Average	0.79	0.29	1.08
LSD 0.05	0.11	0.08	0.11
CV %	8.0	16.9	6.0



Table 28. 2017 DM yields (DM tons/acre) of the MSU Fescue (Tall, Meadow, Festulolium) Variety Trial seeded in East Lansing, Michigan in May 2014.

Tall Fescue	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	2015 Total	3-Year Total
		May 27	July 3	Aug 26	Total			
Tower	5/23/2017	1.55	1.00	1.58	4.14*	4.37*	5.32*	13.82*
TF0705SL †	5/17/2017	1.71	0.95	1.57	4.22*	4.27*	5.16*	13.66*
Dominate	5/15/2017	1.88	0.97	1.45	4.30*	4.29*	4.92*	13.51*
FSG 402 TF ††	5/17/2017	1.81	0.88	1.47	4.16*	4.17*	4.68*	13.00*
Kentucky 31 minus	5/17/2017	1.55	1.05	1.33	3.93*	3.77	5.01*	12.71*
Cajun II	5/15/2017	1.81	0.88	1.34	4.03*	4.14*	4.48	12.64*
MT 9301 †	5/22/2017	1.56	0.87	1.56	4.00*	3.96	4.62*	12.57*
BarElite	5/22/2017	1.44	0.83	1.50	3.78*	4.16*	4.59*	12.53*
Bar FAFL 118701 †	5/20/2017	1.58	0.77	1.23	3.57	3.71	4.77*	12.05
Bariane	5/26/2017	1.21	0.78	1.24	3.24	3.51	4.43	11.17
LSD (0.05) Tall Fescue		0.24	0.17	0.27	0.60	0.35	0.73	1.33
Festulolium								
Becva	5/27/2017	1.24	0.72	0.49	2.46*	3.01	2.6	8.06
Barfest	5/27/2017	0.77	0.32	0.52	1.62	2.95	2.41	6.98
LSD (0.05) Festulolium		0.34	0.14	0.29	0.55	0.73 ns	0.21 ns	1.14 ns
Meadow Fescue								
Cosmonaut	5/23/2017	1.12	0.41	1.02	2.55	3.17	4.04	9.76
Pradel	5/24/2017	0.99	0.39	0.93	2.32	3.2	4.23	9.75
LSD (0.05) Meadow Fescue		0.37	0.14	0.23	0.50 ns	0.69 ns	1.17 ns	2.24 ns
Mean		1.44	0.77	1.23	3.45	3.76	4.38	11.59
LSD (0.05) All Varieties		0.24	0.15	0.24	0.53	0.37	0.66	1.21
CV %		11.5	13.6	13.4	10.7	6.9	10.6	7.31
† Experimental Variety †† Released variety seeded as an experimental. ns - Total yield among varieties in this column are not statistically different * Yield is not statistically different from the greatest value in the column. ‡ Heading date: Date when 50% of all tillers have a fully emerged grass head. An emerged head is completely clear of the flag leaf.								

Table 29. 2017 DM yields (DM tons/acre) of the MSU Perennial Ryegrass and Bromegrass Variety trials seeded in East Lansing, Michigan in May 2014.										
Perennial Ryegrass										
Variety	Type	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	2015 Total	3-Year Total	
			May 27	July 3	Aug 26	Total				
DLFPS-LHT7 †	Hybrid (4n)	5/27/2017	1.17	0.78	0.88	2.82*	3.56*	3.70*	10.08*	
Payday	Perennial (4n)	5/27/2017	0.90	0.57	0.67	2.14	3.15	3.59*	8.89	
Remington	Perennial (4n)	Vegetative	0.65	0.72	0.73	2.10	3.45*	3.10	8.65	
AGRLP-157 †	Perennial (2n)	Vegetative	0.58	0.60	0.69	1.88	3.26*	3.28	8.42	
AGRLP-156 †	Perennial (2n)	5/26/2017	0.61	0.42	0.73	1.75	3.47*	3.00	8.23	
Mara	Perennial (2n)	Vegetative	0.43	0.45	0.65	1.54	3.21	3.01	7.26	
Maximo ‡‡	Intermediate Hybrid	5/27/2017	0.97	-	-	-	3.59*	3.07	-	
Linn ‡‡	Perennial	5/23/2017	0.97	-	-	-	2.94	2.76	-	
Average			0.79	0.59	0.71	2.05	3.33	3.19	8.57	
LSD 0.05			0.24	0.14	0.22	0.42	0.33	0.41	0.84	
CV %			20.5	16.2	20.4	13.6	6.8	8.7	6.7	
‡‡ Maximo and Linn did not persist after first cut in 2017										
Bromegrass										
(Smooth, Meadow, Alaska)										
		2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	2015 Total	3-Year Total	
			May 27	July 3	Aug 26	Total				
BAR BiF 1GRL †	Smooth	5/22/2017	1.60	0.28	1.38	3.25*	3.80	4.17*	11.23	
BAR Bcf 1FFRL †	Meadow	5/16/2017	1.78	0.48	1.10	3.36*	3.87	4.00*	11.22	
Lincoln	Smooth	5/22/2017	1.41	0.20	1.50	3.11*	3.61	4.41*	11.13	
MBA	Smooth	5/17/2017	1.82	0.51	1.00	3.33*	3.95	3.84*	11.11	
Hakari	Alaska	5/27/2017	1.12	0.63	0.86	2.60	3.85	3.55	10.00	
Average			1.55	0.42	1.16	3.13	3.82	3.99	10.94	
LSD 0.05			0.58	0.15	0.44	0.63	0.46 ns	0.63	1.18	
CV %			24.6	24.3	24.7	13.0	7.8	10.2	7.0	
† Experimental Variety										
* Yield is not statistically different from the greatest value in the column.										
‡ 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 at the date of first cutting.										

Table 30. 2017 DM yields (DM tons/acre) of the MSU Orchardgrass and Timothy Variety trials seeded in East Lansing, Michigan seeded in 2014.

Orchardgrass

Variety	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	2015 Total	3-Year Total
		May 19	June 30	Aug 25	Total			
Intensiv	Vegetative	0.79	0.63	0.42	1.84	3.16	5.43	10.43
FSG 506 OG †	5/18/2017	1.29	0.67	0.50	2.45*	3.16	4.76	10.37
OG0604WH †	5/19/2017	1.25	0.60	0.46	2.32*	3.29	4.68	10.29
Echelon	Vegetative	0.88	0.66	0.43	1.97	3.04	5.27	10.28
Barlegro	Vegetative	0.83	0.62	0.40	1.85	3.10	5.31	10.26
Persist	5/15/2017	1.47	0.52	0.46	2.44*	3.25	4.43	10.12
Potomac	5/17/2017	1.24	0.54	0.33	2.11*	3.01	4.72	9.85
Average		1.11	0.61	0.43	2.14	3.14	4.95	10.23
LSD 0.05		0.34	0.12	0.12	0.39	0.76 ns	1.00 ns	1.86 ns
CV %		20.4	13.6	19.4	12.3	16.3	13.7	12.3
Orchardgrass trial seeded in July 2014								

Timothy

Variety	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	2015 Total	3-Year Total
		May 27	July 3	Aug 26	Total			
TM0801 †	5/23/2017	1.72	0.35	1.03	3.10*	4.54*	5.23*	12.88*
Express II ††	Vegetative	1.00	0.36	1.37	2.72*	3.23	4.34	10.31
Climax	Vegetative	0.92	0.38	0.73	2.03	2.99	3.81	8.82
Average		1.21	0.36	1.04	2.62	3.59	4.46	10.67
LSD 0.05		0.32	0.14	0.17	0.49	0.60	0.18	1.15
CV %		15.3	22.3	9.4	10.8	9.6	2.3	6.2

Timothy trial seeded in May 2014

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

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

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

‡ 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 at the date of first cutting.

Table 31. 2017 DM Yields (DM tons/acre) of the MSU Orchardgrass, Tall Fescue, and Timothy Grass Variety Trials seeded in Lake City, Michigan in July 2014.

Orchardgrass	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016	2015	3-Year
		June 6	July 14	Sep 1	Total	Total	Total	Total
Intensiv	6/2/2017	0.79	1.54	0.71	3.03	3.01	3.78	9.82
Echelon	6/1/2017	0.96	1.64	0.69	3.28	3.11	3.20	9.59
Potomac	5/31/2017	0.87	1.47	0.69	3.02	2.78	3.24	9.05
Persist	5/30/2017	0.91	1.20	0.69	2.79	2.97	3.15	8.92
Average		0.88	1.46	0.69	3.03	2.97	3.34	9.34
LSD 0.05		0.45	0.14	0.14	0.49 ns	1.14 ns	1.04 ns	2.56 ns
CV %		31.9	6.1	12.9	10.0	24.1	19.4	17.2
Tall Fescue	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016	2015	3-Year
		June 6	July 14	Sep 1	Total	Total	Total	Total
Tuscany II	6/1/2017	0.59	1.27	0.86	2.71	2.24	4.38	9.34
Kentucky 31 plus	6/2/2017	0.63	1.35	0.81	2.78	2.12	4.32	9.23
Kentucky 31 minus	6/1/2017	0.62	1.15	0.69	2.46	2.05	4.43	8.94
Bariane	6/6/2017	0.39	1.32	0.79	2.50	2.04	3.83	8.37
Average		0.55	1.27	0.79	2.62	2.11	4.24	8.97
LSD 0.05		0.15	0.26	0.20	0.35 ns	0.70 ns	0.85 ns	1.43 ns
CV %		17.3	13	15.3	8.5	20.6	12.6	10.0
Timothy	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016	2015	3-Year
		June 6	July 14	Sep 1	Total	Total	Total	Total
Crest	6/5/2017	1.29	1.72	0.51	3.53*	2.84	4.58*	10.94*
Summit	6/2/2017	1.37	1.47	0.47	3.31*	2.65	4.40*	10.37*
Barpenta	Vegetative	0.86	1.86	0.37	3.09	2.64	3.63	9.35
Climax	Vegetative	0.79	1.60	0.42	2.81	2.59	3.37	8.76
Average		1.08	1.66	0.44	3.18	2.68	4.00	9.86
LSD 0.05		0.59	0.39	0.09	0.34	0.53 ns	0.77	1.54
CV %		34.1	14.6	12.3	6.8	12.3	12.1	9.8

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

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

‡ 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 32. 2017 DM Yields (DM tons/acre) of the MSU Orchardgrass, Tall Fescue, and Timothy Grass Variety Trials seeded in Chatham, Michigan in June 2014.

Orchardgrass	2017 Heading	2017 yields, Two-cuts and Total			2016	2015	3-Year
	Date/Notes ‡	June 16	Oct 4	Total	Total	Total	Total
Intensiv	6/12/2017	0.72	1.01	1.72	1.84	1.50*	5.05
Potomac	6/5/2017	0.75	0.81	1.56	1.92	1.29	4.78
Persist	6/5/2017	0.84	0.83	1.67	2.03	1.04	4.74
Echelon	6/12/2017	0.65	0.94	1.59	1.82	1.22	4.63
Average		0.74	0.90	1.64	1.90	1.26	4.80
LSD 0.05		0.16	0.23	0.28 ns	0.29 ns	0.16	0.52 ns
CV %		13.8	16.1	10.6	9.7	7.9	6.8
Tall Fescue	2017 Heading	2017 yields, Two-cuts and Total			2016	2015	3-Year
	Date/Notes ‡	June 16	Oct 4	Total	Total	Total	Total
Tuscany II	6/14/2017	0.79	0.66	1.45*	2.45*	2.05*	5.95*
Kentucky 31 plus	6/14/2017	0.72	0.62	1.34*	2.32*	2.02*	5.68*
Kentucky 31 minus	6/14/2017	0.75	0.57	1.32*	2.20*	1.94*	5.46*
Bariane	Boot stage	0.52	0.57	1.09	1.84	1.66	4.59
Average		0.69	0.60	1.30	2.20	1.92	5.42
LSD 0.05		0.11	0.16	0.25	0.29	0.23	0.53
CV %		10.3	16.4	12.2	8.4	7.4	6.1
Timothy	2017 Heading	Cut 1 and Total			2016	2015	3-year
	Date/Notes ‡	June 22, 2017			Total	Total	Total
Summit	6/22/2017	1.69*			2.02*	3.28	6.98*
Crest	6/22/2017	1.62*			1.82*	3.13	6.56*
Climax	Boot Stage	1.42			1.53	3.15	6.09
Barpenta	Vegetative	1.30			1.46	3.07	5.82
Average		1.51			1.71	3.15	6.36
LSD 0.05		0.19			0.32	0.31 ns	0.60
CV %		7.8			11.4	6.1	5.9
ns - Total yield among varieties in this column are not statistically different							
* Yield is not statistically different from the greatest value in the column.							
‡ Heading date: Date when 50% of all tillers have a fully emerged grass head.							
An emerged head is completely clear of the flag leaf							
Notes: Vegetative or Boot Stage - Variety in Vegetative or Boot Stage on the date of first cutting.							

Table 33. 2017 DM Yields (DM tons/acre) of the MSU Orchardgrass, Fescue (Tall and Meadow), Perennial Ryegrass, Bromegrass, Kentucky Bluegrass, and Timothy Grass Variety Trials seeded in East Lansing, Michigan in May 2015.

Orchardgrass	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	Two-year Total
		May 19	June 30	Aug 25	Total		
OG 0707 †	5/17/2017	1.61	0.71	0.49	2.81	3.73	6.53
GO-BXCR †	5/19/2017	1.58	0.71	0.50	2.78	3.44	6.22
GO-MOSO †	5/18/2017	1.59	0.76	0.60	2.95	3.56	6.51
Potomac	5/15/2017	1.72	0.72	0.45	2.89	3.29	6.18
Average		1.62	0.72	0.51	2.86	3.50	6.36
LSD 0.05		0.25	0.12	0.14	0.43 ns	0.66 ns	0.67 ns
CV %		9.8	10.9	17.3	9.4	11.7	6.6
Fescue (Tall and Meadow)	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	Two-year Total
		May 19	June 30	Aug 25	Total		
Bariane	Vegetative	0.95	0.97	0.61	2.53	3.32	5.85
Kentucky 31 minus	5/16/2017	1.27	0.98	0.75	2.99*	3.43	6.43*
Kentucky 31 Plus	5/17/2017	1.25	1.00	0.78	3.04*	3.45	6.50*
Pradel (Meadow)	Vegetative	0.78	0.63	0.59	2.01	2.38	4.39
Average		1.06	0.90	0.68	2.64	3.15	5.79
LSD 0.05		0.13	0.17	0.11	0.34	0.29 ns	0.46
CV %		8.0	11.7	10.5	8.1	5.8	5.0
Perennial Ryegrass	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	Two-year Total
		May 19	June 30	Aug 25	Total		
Linn	5/19/2017	1.55	0.45	0.24	2.24	2.41	4.64
Albion	Vegetative	0.60	1.41	0.27	2.28	2.24	4.52
Average		1.07	0.93	0.25	2.26	2.33	4.58
LSD 0.05		0.28	0.29	0.20	0.65 ns	1.21 ns	1.84 ns
CV %		11.7	14.0	35.4	12.7	23.2	17.9
Smooth Bromegrass	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	Two-year Total
		May 19	June 30	Aug 25	Total		
GO-SBF †	5/19/2017	1.04	0.49	0.44	1.97	3.12	5.09
Lincoln	Vegetative	1.45	0.17	0.35	1.97	3.05	5.02
Average		1.24	0.33	0.39	1.97	3.09	5.06
LSD 0.05		0.27	0.42	0.14	0.38 ns	0.37 ns	0.38 ns
CV %		8.8	56.5	16.4	8.6	5.0	3.4
Kentucky Bluegrass	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	Two-year Total
		May 19	June 30	Aug 25	Total		
GO-13NF †	5/16/2017	0.97	0.27	0.23	1.46	2.89	4.36
Ginger	5/10/2017	1.51	0.28	0.21	2.01*	3.15	5.16
Average		1.24	0.28	0.22	1.74	3.02	4.76
LSD 0.05		0.33	0.12	0.16	0.49	0.50 ns	0.95 ns
CV %		11.6	20.1	32.0	12.6	7.4	8.8

Table 33 continued next page (Timothy)

Table 33 continued. 2015 seeding of Timothy in East Lansing

Timothy	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016	Two-year
		May 19	June 30	Aug 25	Total	Total	Total
GO-120X †	Vegetative	1.55	0.99	0.17	2.70	3.36*	6.07*
Climax	Vegetative	0.91	1.64	0.11	2.65	2.85	5.50
Average		1.23	1.31	0.14	2.68	3.11	5.78
LSD 0.05		0.14	0.12	0.10	0.19 ns	0.33	0.27
CV %		5.0	3.9	32.4	3.1	4.8	2.0

† Experimental Variety †† Released variety seeded as an experimental.
ns - Total yield among varieties in this column are not statistically different
* Yield is not statistically different from the greatest value in the column.
‡ 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. 2017 DM Yields (DM tons/acre) of the MSU Orchardgrass, Perennial Ryegrass, Bromegrass, Timothy, and Fescue (Tall and Meadow) Grass Variety Trials seeded in Lake City, Michigan in July 2015.

Orchardgrass	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016	2-Year
		June 6	July 14	Sep 1	Total	Total	Total
Intensiv	6/1/2017	1.68	1.58	0.58	3.85	5.36*	9.20
GO-BXCR †	5/30/2017	1.89	1.48	0.63	4.01	4.98*	8.99
GO-MOSO †	5/30/2017	1.67	1.41	0.66	3.74	4.77*	8.51
Potomac	5/29/2017	1.62	1.49	0.74	3.85	4.53	8.39
Persist	5/30/2017	1.69	1.26	0.74	3.69	4.60	8.30
Average		1.71	1.45	0.67	3.83	4.85	8.68
LSD 0.05		0.32	0.08	0.12	0.33 ns	0.71	1.00 ns
CV %		12.0	4.1	11.7	5.5	9.6	7.5

Timothy	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016	2-Year
		June 6	July 14	Sep 1	Total	Total	Total
Zenyatta	6/2/2017	3.21	1.21	0.66	5.08	5.76	10.85*
Summit	6/2/2017	2.99	1.13	0.61	4.73	5.51	10.24*
Climax	Vegetative	3.09	1.00	0.56	4.65	5.42	10.07*
GO-120X †	6/5/2017	3.12	1.00	0.43	4.55	5.37	9.91
Average		3.10	1.09	0.56	4.75	5.52	10.27
LSD 0.05		0.38	0.15	0.22	0.64 ns	0.46 ns	0.82
CV %		7.7	8.5	24.5	8.5	5.2	5.0

Table 34 continued next page (Tall and Meadow Fescue, Perennial Ryegrass, Smooth Bromegrass)

Table 34 continued. Tall and Meadow Fescue, Perennial Ryegrass, and Smooth Bromegrass

Fescue (Tall and Meadow)	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	2-Year Total
		June 6	July 14	Sep 1	Total		
Tall Fescue							
Bariane	6/6/2017	1.66	1.68	1.06	4.40	5.68	10.09
Kentucky 31 minus	5/30/2017	1.94	1.54	0.97	4.44	5.52	9.97
BAR FA 13131 †	5/31/2017	2.04	1.32	0.93	4.28	5.53	9.81
Tuscany II	6/1/2017	1.94	1.52	0.98	4.43	5.34	9.78
Kentucky 31 Plus	5/31/2017	1.90	1.51	1.01	4.43	5.23	9.66
LSD 0.05 Tall Fescue		ns	0.17	ns	ns	ns	ns
Meadow Fescue							
Pradel	6/2/2017	1.82	1.23	0.76	3.82	4.93	8.76
Bar FPF32 †	6/3/2017	1.80	1.19	0.69	3.67	4.92	8.59
LSD 0.05 Meadow Fescue		ns	ns	ns	ns	ns	ns
Average of Fescue varieties							
		1.87	1.43	0.91	4.21	5.31	9.52
LSD 0.05		0.27	0.17	0.15	0.42	0.67	0.98
CV %		9.6	8.1	11.0	6.7	8.5	6.9
Perennial Ryegrass							
Perennial Ryegrass	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	2-Year Total
		June 6	July 14	Sep 1	Total		
Albion	Vegetative	0.92	1.34	0.58	2.84*	4.88*	7.71*
PayDay	6/5/2017	1.22	1.07	0.48	2.77*	4.69*	7.46*
Mara	6/6/2017	0.77	0.92	0.53	2.22	4.26	6.49
Average		0.97	1.11	0.53	2.61	4.61	7.22
LSD 0.05		0.18	0.15	0.18	0.28	0.61	0.69
CV %		10.7	7.8	19.4	6.2	7.6	5.5
Smooth Bromegrass							
Smooth Bromegrass	2017 Heading Date ‡	2017 yields, Three-cuts and Total				2016 Total	2-Year Total
		June 6	July 14	Sep 1	Total		
Lincoln	6/6/2017	1.98	1.30	0.46	3.73	5.52	9.24*
GO-SBF †	6/1/2017	1.91	1.21	0.46	3.58	5.38	8.96
Average		1.94	1.25	0.46	3.65	5.45	9.10
LSD 0.05		0.12	0.10	0.23	0.33 ns	0.20 ns	0.12
CV %		2.6	3.5	22.3	4.1	1.7	0.6

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

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

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

‡ 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. 2017 DM Yields (DM tons/acre) of the MSU Timothy, Tall Fescue, and Orchardgrass, Fescue, Timothy, Perennial Ryegrass, Kentucky Bluegrass, and Smooth Bromegrass Grass Variety Trials seeded in Chatham, Michigan in August 2015.

Orchardgrass	2017 Heading Date/Notes ‡	2017 yields, Two-cuts and Total			2016 Total	Two-Year Total
		June 16	Oct 4	Total		
Potomac	6/7/2017	0.59	0.61	1.20	2.49*	3.68*
GO-MOSO †	6/10/2017	0.53	0.61	1.13	2.26*	3.39*
GO-BXCR †	6/9/2017	0.55	0.43	0.97	2.11	3.09
Average		0.56	0.55	1.10	2.28	3.39
LSD 0.05		0.15	0.14	0.25 ns	0.29	0.50
CV %		16.1	15.7	13.2	7.3	8.6
Fescue	2017 Heading Date/Notes ‡	2017 yields, Two-cuts and Total			2016 Total	Two-Year Total
		June 16	Oct 4	Total		
(Tall and Meadow)						
Pradel (Meadow)	6/12/2017	0.72	0.44	1.16*	2.60*	3.76*
Kentucky 32	6/15/2017	0.58	0.41	1.00*	2.68*	3.68*
Kentucky 31 plus	6/15/2017	0.64	0.43	1.07*	2.52*	3.59*
Bariane	Boot Stage	0.48	0.39	0.86	1.99	2.85
Average		0.60	0.42	1.02	2.45	3.47
LSD 0.05		0.14	0.15	0.27	0.37	0.51
CV %		14.4	22.6	16.4	9.5	9.1
Timothy	2017 Heading Date/Notes ‡	Cut 1 and Total			2016 Total	Two-Year Total
		June 22, 2017				
Zenyatta	6/22/2017	1.89			1.67*	3.56
GO-120x †	Early Heading	1.95			1.53*	3.48
Climax	Early Heading	1.82			1.53*	3.35
Winnetow	Early Heading	2.09			1.02	3.12
Average		1.94			1.44	3.38
LSD 0.05		0.36 ns			0.43	0.69 ns
CV %		11.6			18.8	12.8
Perennial Ryegrass	2017 Heading Date/Notes ‡	Cut 1 and Total			2016 Total	Two-Year Total
		June 22, 2017				
Linn	6/14/2017	0.42*			1.56*	1.98*
Remington	Boot Stage	0.33*			1.15	1.49
Mara	Boot Stage	0.17			1.27	1.44
Albion	Vegetative	0.20			0.93	1.13
Average		0.28			1.23	1.51
LSD 0.05		0.10			0.19	0.18
CV %		22.4			9.9	7.2

Table 35 continued next page (Kentucky Bluegrass and Smooth Bromegrass)

Table 35 continued. Kentucky Bluegrass and Smooth Bromegrass.

Kentucky Bluegrass

	2017 Heading	2017 yields, Two-cuts and Total			2016	Two-Year
	Date/Notes ‡	6/8/2017	10/17/2017	Total	Total	Total
Ginger	5/30/2017	No data	0.37	0.37	0.98	1.35
GO-13 NF †	6/5/2017	No data	0.50	0.50	1.08	1.58*
Average			0.44	0.44	1.03	1.47
LSD 0.05			0.17	0.17 ns	0.12 ns	0.12
CV %			17.2	17.2	4.9	4.0

Smooth Bromegrass

	2017 Heading	2017 yields, Two-cuts and Total			2016	Two-Year
	Date/Notes ‡	6/8/2017	10/17/2017	Total	Total	Total
GO-SBF †	6/8/2017	No data	0.45	0.45	1.95	2.39
Lincoln	25% Headed	No data	0.41	0.41	1.59	1.99
Average			0.43	0.43	1.77	2.19
LSD 0.05			0.23	0.23 ns	0.52 ns	0.71 ns
CV %			23.8	23.8	13.2	14.4

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

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

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

‡ Heading date: Date when 50% of all tillers have a fully emerged grass head.

An emerged head is completely clear of the flag leaf

Notes: Vegetative, Boot, or 25% Headed

Maturity stage of variety not yet headed on the date of first cutting.

Table 36. 2017 DM yields (DM tons/acre) of the MSU Perennial Ryegrass, Timothy, Orchardgrass, and Fescue (Tall, Meadow, and Festulolium) Grass Variety Trials seeded in East Lansing, Michigan in August 2016.

Perennial Ryegrass

		2017 Heading	2017 yields, Three-cuts and Total			
		Date ‡	May 19	June 29	Aug 23	Total
Bison 2 (4n)	(Perennial)	Vegetative	1.91	1.68	0.45	4.04*
Maximo (4n)	(Intermediate)	Vegetative	1.88	1.56	0.51	3.95*
Dexter 1 (4n)	(Perennial)	Vegetative	1.70	1.25	0.14	3.09
Garbor (4n)	(Perennial)	Vegetative	1.74	1.13	0.12	2.99
Linn	(Perennial)	5/17/2017	2.27	0.55	0.08	2.90
Average			1.90	1.23	0.26	3.39
LSD 0.05			0.19	0.14	0.05	0.28
CV %			6.4	7.1	12.9	5.3

Table 36 continued next page Timothy, Orchardgrass, and Fescue

Table 36 continued. Timothy, Orchardgrass, and Fescue (Tall, Meadow, and Festulolium).

Timothy					
	2017 Heading	2017 yields, Three-cuts and Total			
	Date ‡	May 19	June 29	Aug 23	Total
Climax	Vegetative	2.42	0.96	0.16	3.54
Zenyatta	Vegetative	1.80	1.09	0.44	3.33
TM0704 †	Vegetative	1.88	0.99	0.41	3.27
Average		2.03	1.02	0.34	3.38
LSD 0.05		0.45	0.19	0.27	0.54 ns
CV %		12.7	10.6	43.8	9.1
Orchardgrass					
	2017 Heading	2017 yields, Three-cuts and Total			
	Date ‡	May 19	June 29	Aug 23	Total
Echelon	5/19/2017	2.20	1.62	0.87	4.69*
Lyra	5/18/2017	2.44	1.22	0.58	4.24
Potomac	5/15/2017	2.31	1.36	0.57	4.24
Treposno	5/17/2017	2.29	1.32	0.58	4.19
Average		2.31	1.38	0.65	4.34
LSD 0.05		0.14	0.11	0.05	0.17
CV %		4.0	5.1	5.6	2.4
Fescue					
Tall Fescue	2017 Heading	2017 yields, Three-cuts and Total			
	Date ‡	May 19	June 29	Aug 23	Total
FTF 73 †	5/19/2017	1.66	1.31	0.81	3.78
Kentucky 31 minus	5/17/2017	1.92	1.10	0.72	3.74
FTF 70 †	5/18/2017	1.66	1.19	0.85	3.72
FTF 96 †	5/18/2017	1.59	1.20	0.92	3.71
Tower	5/22/2017	1.61	1.13	0.91	3.65
LSD 0.05 Tall Fescue		0.21	ns	ns	ns
Meadow Fescue					
Raskila	Vegetative	2.02	1.06	0.46	3.54
Pradel	Vegetative	1.54	1.00	0.61	3.15
LSD 0.05 Meadow Fescue		ns	ns	ns	ns
Festulolium (Tall Fescue type)					
Mahulena	5/14/2017	1.83	1.14	0.68	3.66
Fojtan	5/18/2017	1.52	1.03	0.61	3.17
LSD 0.05 Festulolium		0.42	ns	0.07	ns
Average of all Fescue varieties		1.71	1.13	0.73	3.57
LSD 0.05		0.22	0.23	0.18	0.37
CV %		8.9	13.6	17.5	7.2
† Experimental Variety †† Released variety seeded as an experimental.					
ns - Total yield among varieties in this column are not statistically different					
* Yield is not statistically different from the greatest value in the column.					
‡ 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. 2017 Seeding-year yields (DM tons/acre) of the MSU Perennial Grass Variety Trials (Tall and Meadow Fescue, Perennial Ryegrass and Festulolium, Orchardgrass, and Timothy) seeded in East Lansing, Michigan in May 2017.

Fescue (Tall and Meadow)			Aug 21
Swaj	Tall Fescue		0.86
Pradel	Meadow Fescue		0.80
Kentucky 31 minus	Tall Fescue		0.77
SW Minto	Meadow Fescue		0.76
FP 16058 †	Meadow Fescue		0.70
Florine	Tall Fescue		0.61
Average			0.75
LSD 0.05			0.40
CV %			35.3
Orchardgrass			Aug 21
Lucharm	Orchardgrass		0.70
Lukir	Orchardgrass		0.61
Potomac	Orchardgrass		0.53
Average			0.61
LSD 0.05			0.29
CV %			27.2
Perennial Ryegrass, Festulolium			Aug 21
Federo	Fest (PR Type)		0.80
Remington	P Ryegrass		0.44
RAD MFP - 141 †	P Ryegrass		0.40
LP 16237 †	P Ryegrass		0.37
Tomaso	P Ryegrass		0.34
LP 16238 †	P Ryegrass		0.32
Linn	P Ryegrass		0.24
Average			0.42
LSD 0.05			0.16
CV %			25.5
Timothy			Aug 21
Climax	Timothy		0.56
KY Early Timothy	Timothy		0.56
Average			0.56
LSD 0.05			ns
CV %			50.7

† Experimental Variety

Notes - Two cuttings in 2017, Data reported for one weed-free harvest on Aug 21

Table 38. 2017 Yields (DM tons/acre) of the MSU Annual Grass Variety Trial seeded in East Lansing, Michigan in May 2017.

		2017 yields, Three-cuts and Total			
Ryegrass Entries	Type	June 29	July 21	Sep 12	Total
Marshall (Check)	Annual Ryegrass	0.84	0.81	0.22	1.88
Meroa	Italian Ryegrass	0.56	0.71	0.20	1.48
Fox	Italian Ryegrass	0.47	0.63	0.33	1.42
SIRG 16A †	Italian Ryegrass	0.42	0.63	0.32	1.38
Bareextra	Italian Ryegrass	0.42	0.60	0.28	1.30
Firkin	Italian Ryegrass	0.39	0.60	0.25	1.25
LM16370 †	Italian Ryegrass	0.34	0.59	0.25	1.18
LM16371 †	Italian Ryegrass	0.35	0.54	0.20	1.10
Average		0.47	0.64	0.26	1.37
LSD 0.05 Ryegrass Entries		0.09	0.13	0.10	0.20
Oat Entries	Type	June 29	July 21	Sep 12	Total
Luxurial	Black Oat	0.93	1.06	0.25	2.25
Check variety	Regular Oat	0.68	0.71	0.26	1.65
LSD 0.05 (Oats)		0.23	0.23	0.19	0.28
Average all entries		0.54	0.69	0.26	1.49
LSD 0.05 (all entries)		0.11	0.12	0.11	0.20
CV %		12.5	12.4	28.9	9.3

† Experimental Variety

Notes - Annual ryegrass and Oats headed at each cutting, Italian ryegrass vegetative on date of each cutting

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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.americasalalfa.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	608-516-0101	www.byronseeds.net
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
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
S&W Seeds	916-554-5480	www.swseedco.com
Wilbur-Ellis Seeds	989-323-7701	http://ag.wilburellis.com/
Winfield Solutions	989-845-2093	www.winfield.com
W-L Research	800-406-7662	www.wlresearch.com