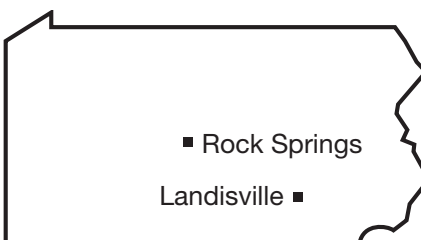




# 2017 FORAGE TRIALS REPORT

## SUMMARY

The “2017 Forage Trials Report” summarizes performance data collected from ongoing forage trials at two sites in Pennsylvania. The report includes data from alfalfa and cool-season (forage) grass trials established at the Russell E. Larson Agricultural Research Center at Rock Springs and the Southeast Research and Extension Center at Landisville.



### Forage Growing Conditions and Insect Pressure in 2017

Weather in April was excellent for forage planting across much of Pennsylvania. However, extremely fast and heavy rain events in mid-April caused some soil erosion and silting, which resulted in poor stands in some areas. More normal weather patterns occurred in May, which allowed a lot of the first crop to be harvested without getting wet. The weather patterns then became mixed over much of the state, with above-average rainfall in some areas. Ultimately, many forage producers were heading into the fall with adequate forage supplies. Mild temperatures during September and October were ideal for forage growth, which provided an additional harvest for some producers.

Alfalfa weevil populations were generally low, with few reported outbreaks. Potato leafhopper infestations were high across most of the state, but the moist weather in some areas allowed the alfalfa to rebound quickly from leafhopper damage. Cereal leaf mite damage continues to be a problem for timothy production in some areas.

### Criteria for Reporting Varieties

Many varieties listed in this report are

eligible for certification by seed-certifying agencies and are marketed in Pennsylvania (see Tables 1, 10, and 13). Some entries are experimental and may or may not be marketed in the future. Proprietary and public varieties are included; blends and “commons” are not included.

### Interpreting Yield Data and Stand Scores

Yield summaries and stand scores for individual trials appear in Tables 2 through 9, and 11 through 17. Although the trials contain up to 40 total entries, many of these are advanced experimental varieties or not currently offered for sale in Pennsylvania. After these entries are named and/or become available for purchase in Pennsylvania, they will be included in future reports.

Experimental alfalfa entries that become named varieties will be footnoted as such. They will be published in the “Forage Trials Report” only if the newly named variety is entered as a commercial variety in the next available trial.

Varieties are ranked according to their yield performance. In addition, yield totals for the previous harvest years are reported, as well as average yields over the life of the stand. It is important to evaluate the average yields and the yields

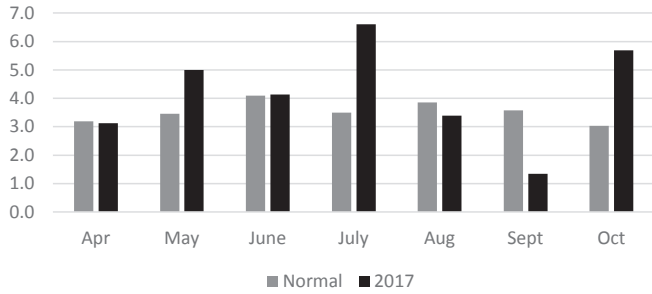
obtained this year, as performance over a three- to four-year period is valuable in a long-term forage rotation.

The stand score is a visual estimation of the amount of groundcover following harvest in the fall. The stand score is reported on a scale from 1 to 100, with 100 considered a perfect stand. This score is valuable as an indicator of varietal persistence.

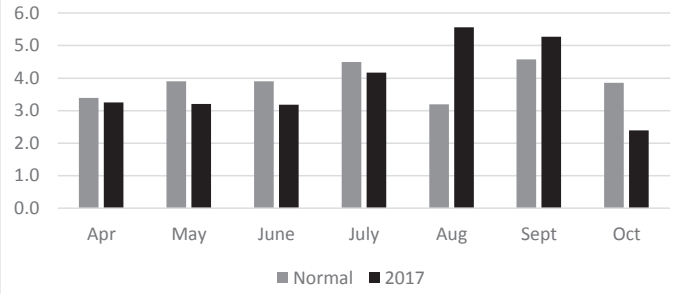
Please keep in mind when reviewing the yield and stand tables that differences between varieties are significant only if the least significant difference (LSD) between varieties is exceeded. LSD is the minimum difference between any two varieties necessary for us to be 95 percent confident that this difference is not attributable to mere chance. For example, if variety A is 0.5 ton per acre higher in yield than variety B, then this difference is statistically significant if the LSD is 0.5 or less. If the LSD is 0.51 or greater, then we cannot be confident that variety A really yields higher than B under given environmental and management conditions.

The value for coefficient of variation (CV) is a measure of relative variation useful in evaluating the precision achieved in an experiment. In grain and forage trials, for example, the CV for yield often is between 5 and 20 percent. Acceptable levels of the CV vary for each trait measured. Confidence in the reliability of the experimental results declines as the CV increases. Uncontrollable or immeasurable variations in soil fertility, soil drainage, and other environmental factors contribute to increased CV levels.

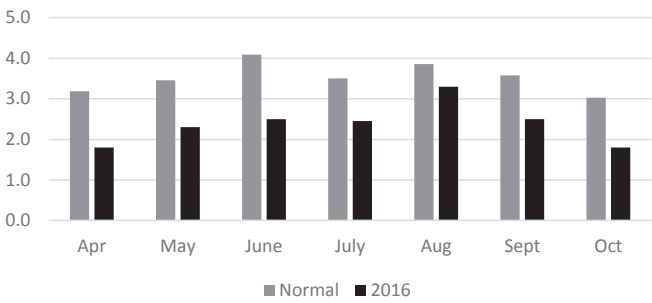
**Figure 1. 2017 Precipitation at Rock Springs (inches)**



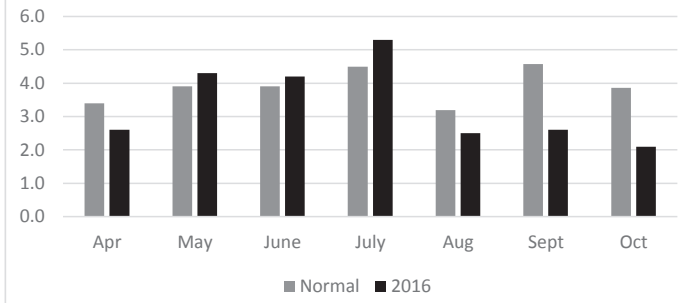
**Figure 2. 2017 Precipitation at Landisville (inches)**



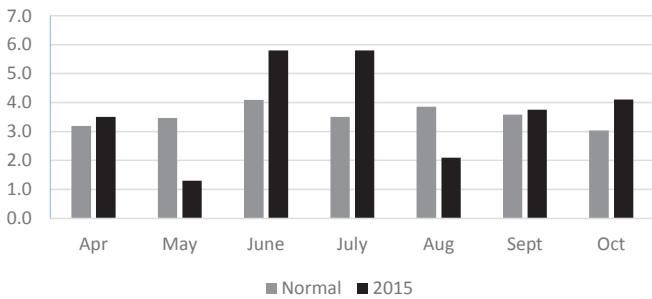
**Figure 3. 2016 Precipitation at Rock Springs (inches)**



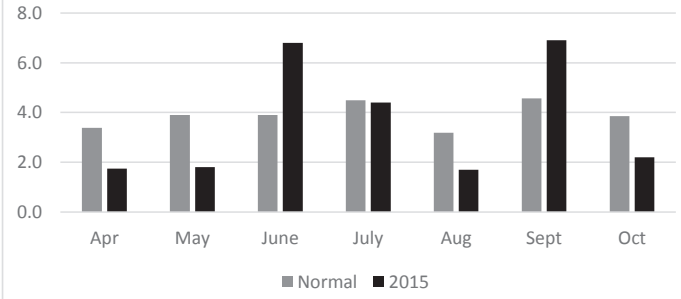
**Figure 4. 2016 Precipitation at Landisville (inches)**



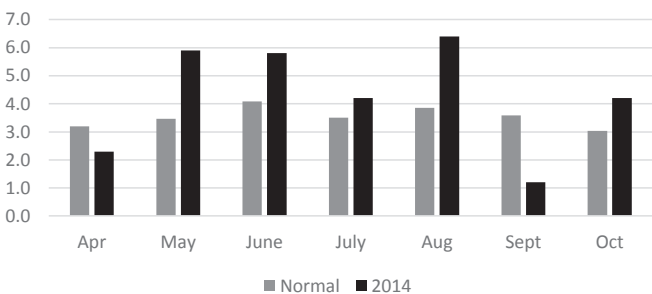
**Figure 5. 2015 Precipitation at Rock Springs (inches)**



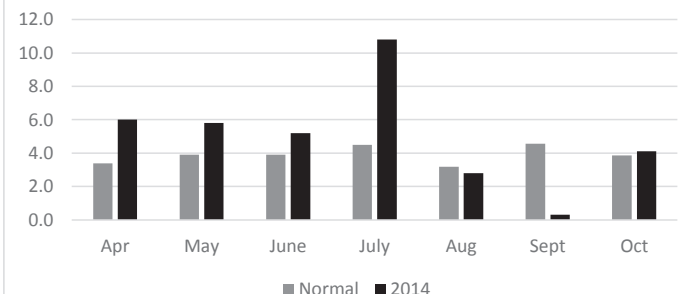
**Figure 6. 2015 Precipitation at Landisville (inches)**



**Figure 7. 2014 Precipitation at Rock Springs (inches)**



**Figure 8. 2014 Precipitation at Landisville (inches)**



## ALFALFA

Many varieties of alfalfa exist, and selection of the appropriate variety is an important management decision. This report lists performance data for those varieties included in the Penn State Alfalfa Variety Testing Program. Evaluation trials include both commercially available and advanced experimental varieties. Trials are initiated each year at the Rock Springs and Landisville research stations. In each trial, collection of yield, stand, and other data continues for a maximum of four years or until the stand becomes so depleted that data collection is no longer worthwhile.

Trials at both locations are established on well-drained Hagerstown silt loam soils. Major site differences are likely to be reflected in the longer growing season, slightly elevated temperatures, and tendency toward late summer drought at the Landisville site.

Keep in mind a few points when evaluating alfalfa variety performance data:

- Selection of a variety on the basis of yield performance alone is generally less satisfactory than selections that also consider stand score and pest resistance.
- Conditions on most farms are such that several varieties may perform nearly equally. It usually is not necessary to rely on a single variety.
- No variety, regardless of its excellence, can thrive under poor management. Good management considers all aspects of alfalfa production, including seedbed preparation, lime and fertilizer, seeding, pest control, harvest, storage, and postharvest treatment. Many modern varieties are adapted to intensive management.

### Fall Dormancy

Fall dormancy ratings of alfalfa range from one (very dormant) to nine (having no dormancy). Varieties that have less fall dormancy (higher numerical rating) regrow faster after harvest and exhibit greater growth in the fall compared to those varieties with more fall dormancy (lower numerical rating).

### Pest Resistance

Disease and insect resistance may be the most important attributes of an alfalfa variety. The ratings for pest resistance given in this report can serve as a good indicator of a variety's potential performance in your area. Be aware of your pest resistance needs and choose the appropriate varieties.

Sclerotinia stem and crown rot is becoming a serious concern for growers throughout the state because there is little plant resistance to the disease. Late summer no-till seedings seem to be more susceptible to the disease. Newly established seedlings are very susceptible to infection in the fall when the fungus is active. Plants are attacked rapidly by the pathogen and die the following spring. Plants established in the spring are more resistant to the pathogen and are not as severely damaged as the younger plants. The fungus survives as hard, black structures (sclerotia) on or near the soil surface. In the fall, the sclerotia produce spores that cause infection. Plowing buries sclerotia, thus reducing inoculum and subsequent infection.

Resistance to *Aphanomyces* can be found in some of the newest varieties. *Aphanomyces eutiches* is a soilborne fungus with behavior and requirements similar to *Phytophthora*. It is a wet-soil seedling pathogen and can be expected to thrive under cool, waterlogged conditions. Resistance may be beneficial when growing alfalfa on poorly drained soils. More specific information about many alfalfa diseases is included in the current *Penn State Agronomy Guide*.

Crown and root rot complex is still a problem. Because of the complexity of the pathogens involved, resistance to this disease is not very high in any variety. Good management slows the progress of this disease. More specific information is included in the current *Penn State Agronomy Guide*.

Plant breeders develop alfalfa varieties by selecting from genetically diverse populations. Within such populations, individual plants may vary widely in their response to a particular disease or

insect. Some may be highly resistant and others very susceptible. A particular pest resistance rating usually reflects the response of the majority of plants in the variety. In our trials, varieties with the most pest resistance ratings of "moderate" or higher have usually shown better long-term performance.

### Guidelines for Selecting Alfalfa Varieties

To select alfalfa varieties on the basis of the trial results, follow these suggestions:

1. Determine which of the trial sites most resembles your farm in terms of soil and growing season. Performance data of varieties at this site are likely to provide more relevant selection information.
2. Look at the performances of the varieties at both trial sites. Varieties that do equally well at both sites are probably adapted to a wider range of environmental conditions.
3. Performance data over several years can be very useful in selecting a variety since some varieties seem to decline with age more rapidly than others.
4. For long-term rotations, the most recent harvest-year data should receive major consideration. If you plan to harvest the alfalfa for three years or fewer, then high performance during early years should be given major consideration.
5. Disease and pest resistance ratings should be examined in relation to yield, especially if your area is known to have problems with alfalfa diseases and pests. For example, *Phytophthora* root rot resistance may be exceptionally important on farms with moderately to poorly drained soils.

Table 1 lists the marketers of alfalfa varieties included in this report and the trial table numbers in which the varieties appear. Also included are fall dormancy ratings and selected disease and insect resistance ratings. Tables 2 through 9 offer guidelines for assessing the production potential of various alfalfa varieties.

**Table 1. Alfalfa varieties marketed in Pennsylvania and listed in this report.**

Fall dormancy ratings of alfalfa range from one (very dormant) to nine (having no dormancy). Varieties that are less fall dormant (higher numerical rating) regrow faster after harvest and exhibit greater growth in the fall compared to those varieties with greater fall dormancy (lower numerical rating).

**BW** = Bacterial Wilt, **VW** = Verticillium Wilt, **FW** = Fusarium Wilt, **AN** = Anthracnose, **PRR** = Phytophthora Root Rot, **APH1**=Aphanomyces Race 1

The Fall Dormancy and Pest Resistance Ratings in this table are from the National Alfalfa Alliance and/or the alfalfa variety breeder and have not been verified by Penn State.

Resistance Key: **S** = 0 to 5 percent; **LR** = 6 to 14 percent; **MR** = 15 to 30 percent; **R** = 31 to 50 percent; **HR** = 51 percent or greater

If the resistance rating for a variety is not listed, the information is not available.

Variety	Marketer	Pest Resistance Rating							Appears in Table No.
		Fall Dormancy	BW	VW	FW	AN	PRR	APH1	
4H400	Mycogen Seeds	4	HR	HR	HR	HR	HR	HR	4
54QR04	Pioneer Hi-Bred	4	HR	HR	HR	HR	HR	HR	2, 6
55H94	Pioneer Hi-Bred	5	HR	HR	HR	HR	HR	HR	2, 6
55Q27	Pioneer Hi-Bred	5	HR	HR	HR	HR	HR	HR	2, 3, 6, 7
55V12	Pioneer Hi-Bred	5	R	HR	HR	HR	HR	HR	7
55V50	Pioneer Hi-Bred	5	HR	HR	R	HR	HR	HR	2, 3, 6, 7
428RR	Seedway/GROWMARK FS	4	HR	HR	HR	HR	HR	HR	2, 4, 6, 8
6585Q	Nexgrow	5	HR	HR	HR	HR	HR	HR	2
DG 4210	Crop Production Services	4	HR	HR	HR	HR	HR	HR	2, 6
DKA 40-51 RR	Dekalb	4	HR	HR	HR	HR	HR	HR	9
DKA 41-18 RR	Dekalb	4	HR	HR	HR	HR	HR	HR	2, 3, 6, 7
DKA 44-16 RR	Dekalb	4	HR	HR	HR	HR	HR	HR	9
FF42.A2	LaCrosse Seed	4	HR	HR	HR	HR	HR	HR	4, 5, 8, 9
FSG 403LR	Seedway	4	HR	HR	R	HR	HR	HR	2, 6
FSG 408DP	Seedway	4	HR	R	HR	HR	HR	HR	2, 4, 6, 8
FSG 415BR	Seedway	4	HR	HR	HR	HR	HR	HR	4
FSG 426	Seedway	4	HR	HR	HR	HR	HR	HR	4, 8
FSG 524	Seedway	5	HR	HR	HR	HR	HR	HR	2, 6
GA-535	Merit Seed	5	HR	HR	HR	HR	HR	HR	2, 6
HiGest 360	Chemgro Seeds	3	HR	HR	HR	HR	HR	HR	5, 7
KF-406 A2	Byron Seeds	4	HR	HR	HR	HR	HR	HR	5, 9
KF-425 HD	Byron Seeds	4	HR	HR	HR	HR	HR	HR	5, 9
L 455 HD	Legacy Seeds	4	HR	HR	HR	HR	HR	HR	2, 6
Magnitude	GROWMARK FS	4	HR	HR	HR	HR	HR	HR	6
Mariner IV	GROWMARK FS	4	HR	HR	HR	HR	HR	HR	6
Oneida VR	Public	3	R	HR	HR	MR	MR	—	2, 4, 5, 6, 7, 8, 9
Persist III	Doebler's	4	HR	HR	HR	HR	HR	HR	3, 4, 5, 7, 8, 9
Plus III	Doebler's	4	HR	HR	HR	HR	HR	HR	4, 5, 8, 9
Profusion 2HX	King's AgriSeeds	4	HR	HR	HR	HR	HR	HR	6
Rebound 6.0	Croplan	4	HR	HR	HR	HR	HR	HR	5
Rebound 6XT	Croplan	4	HR	HR	HR	HR	HR	HR	5, 9
ReNew+	T.A. Seeds	4	HR	HR	HR	HR	HR	HR	4
RR Vamoose	Croplan	4	HR	HR	HR	HR	HR	HR	5
SW 4107	S&W Seed Co.	4	HR	HR	HR	HR	HR	HR	5
SW 5210	S&W Seed Co.	5	HR	HR	HR	HR	HR	HR	5, 9
SW 5512Y	S&W Seed Co.	5	HR	HR	HR	HR	HR	HR	4, 8
SW 5909	S&W Seed Co.	5	HR	HR	HR	HR	HR	HR	4, 8
Vernal	Public	4	R	S	MR	S	S	S	2, 3, 4, 5, 6, 7, 9
WL 365 HQ	W-L Alfalfas	5	HR	HR	HR	HR	HR	HR	5, 9

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**Alfalfa Marketers Listed in This Report****Byron Seeds, LLC**

Rockville, IN 47872  
byronseeds.net

**Chemgro Seeds**

E. Petersburg, PA 17520  
Phone: 800-346-4769  
www.chemgro.com

**Croplan**

St. Paul, MN 55164  
www.croplan.com

**Crop Production Services**

Holtwood, PA 17532  
Phone: 707-284-5350  
www.cropproductionservices.com

**Dekalb**

St. Louis, MO 63167  
Phone: 800-768-6387  
www.asgrowanddekalb.com

**Doebler's**

Jersey Shore, PA 17740  
Phone: 570-753-3210  
www.doebler.com

**FS Seed**

Bloomington, IL 61701  
Phone: 309-557-6000  
www.fssystem.com

**GROWMARK FS**

York, PA 17402  
Phone: 800-338-4769  
home.gromarkfs.com

**King's AgriSeeds**

Ronks, PA 17572  
Phone: 717-687-6224  
Kingsagriseeds.com

**LaCrosse Seed**

LaCrosse, WI 54603  
608-783-9560  
www.lacrosseseed.com

**Legacy Seeds**

Scandinavia, WI 54977  
Phone: 866-791-6390  
www.legacyseeds.com

**Merit Seed**

Millersburg, OH 44654  
Phone: 330-893-3196

**Mycogen Seeds**

Indianapolis, IN 46268  
www.mycogen.com

**NEXGROW Alfalfa Seeds**

Leaflet Listing: Nexgrow Alfalfa  
Minnetonka, MN 55305  
800-445-0956  
www.plantNexgrow.com

**Pioneer Hi-Bred Int'l, Inc.**

Mount Joy, PA 17552  
Phone: 717-653-5605  
pioneer.com

**S&W Seed Co.**

Fresno CA 93720  
www.swseedco.com

**Seedway**

Mifflinburg, PA  
Phone: 800-338-2137  
www.seedway.com

**T.A. Seeds**

Jersey Shore, PA 17740  
Phone: 570-753-5503  
www.taseeds.com

**W-L Alfalfas**

Ozark, MO 65721  
www.wlalfalfas.com

**Table 2. 2013 alfalfa trial—Rock Springs.**

Variety	2017 Yield	2016 Yield	2015 Yield	2014 Yield	Four-Year Average	Stand 10/1/2017
55Q27	11.90	9.94	11.32	9.11	<b>10.68</b>	85
55V50	11.98	9.25	10.62	9.33	<b>10.36</b>	85
FSG 524	10.69	8.96	10.72	9.15	<b>9.92</b>	84
DG 4210	10.95	9.31	10.52	8.58	<b>9.91</b>	88
GA-535	11.39	9.19	10.18	8.22	<b>9.80</b>	87
428RR	10.50	8.69	10.39	8.90	<b>9.70</b>	89
6585Q	10.31	8.93	10.32	8.86	<b>9.66</b>	87
FSG 408DP	10.28	8.44	9.68	8.73	<b>9.36</b>	81
L 455 HD	10.30	8.88	9.99	7.95	<b>9.34</b>	85
54QR04	10.09	8.56	10.02	8.17	<b>9.27</b>	85
FSG 403LR	10.14	8.39	9.68	8.38	<b>9.18</b>	82
DKA 41-18 RR	9.68	8.40	9.75	8.09	<b>9.01</b>	84
55H94	9.88	7.12	8.12	8.10	<b>8.39</b>	80
5454*	8.73	6.99	8.71	7.74	<b>8.08</b>	81
5312*	8.68	6.72	8.06	7.54	<b>7.77</b>	81
Vernal	7.78	6.70	7.73	7.20	<b>7.37</b>	75
Oneida VR	7.36	6.73	6.90	6.29	<b>6.90</b>	74
<b>GRAND MEAN</b>	<b>10.13</b>	<b>8.30</b>	<b>9.57</b>	<b>8.24</b>	<b>9.11</b>	<b>83</b>
<b>CV (%)</b>	<b>10.49</b>	<b>13.63</b>	<b>10.81</b>	<b>13.04</b>	<b>10.86</b>	<b>5.38</b>
<b>LSD (p = 0.05)</b>	<b>1.49</b>	<b>1.58</b>	<b>1.45</b>	<b>1.62</b>	<b>1.38</b>	<b>6.21</b>

\*Not commercially available.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded April 11, 2013.
- Yields are given in tons per acre (DM basis).
- Yields indicated represent four cuttings.
- Stand score is based on a scale from 1 to 100. A 100 is considered a perfect stand.
- Grand mean, CV, and LSD values represent 32 total entries.
- Entries are ranked in order of decreasing yield based on the four-year average.
- Means are LSM means derived from statistical analysis. Therefore, season or multiple-year totals may not be the arithmetic sum of individual cuts or years, respectively.

**Table 3. 2014 alfalfa variety trial—Rock Springs.**

Variety	2017 Yield	2016 Yield	2015 Yield	Three-Year Average	Stand 10/1/2017
55Q27	11.80	7.92	9.41	<b>9.73</b>	94
Sundance III*	11.70	7.80	9.02	<b>9.51</b>	95
AFX065033**	11.12	8.04	9.21	<b>9.45</b>	95
55V50	11.34	7.86	8.92	<b>9.43</b>	94
AFX094017**	10.86	7.39	8.65	<b>8.99</b>	94
AFX085029**	10.80	7.05	8.30	<b>8.75</b>	94
Persist III	9.30	7.14	8.73	<b>8.42</b>	94
DKA 41-18 RR	9.39	6.78	8.68	<b>8.27</b>	94
Vernal	7.37	5.90	7.99	<b>7.10</b>	94
<b>GRAND MEAN</b>	<b>10.41</b>	<b>7.32</b>	<b>8.77</b>	<b>8.85</b>	<b>94</b>
<b>CV (%)</b>	<b>10.83</b>	<b>14.71</b>	<b>9.07</b>	<b>9.55</b>	<b>0.95</b>
<b>LSD (p = 0.05)</b>	<b>1.58</b>	<b>1.51</b>	<b>1.11</b>	<b>1.18</b>	<b>1.26</b>

\*Variety tested with experimental seed that may or may not give performance similar to commercially available seed.

\*\*Not commercially available.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded August 27, 2014.
- Yields are given in tons per acre (DM basis).
- Yields indicated represent four cuttings.
- Stand score based on a scale from 1 to 100. A 100 is considered a perfect stand.
- Grand mean, CV, and LSD values represent nine total entries.
- Entries are ranked in order of decreasing yield based on the three-year average.
- Means are LSMeans derived from statistical analysis. Therefore, season or multiple-year totals may not be the arithmetic sum of individual cuts or years, respectively.

**Table 4. 2015 alfalfa variety trial—Rock Springs.**

Variety	2017 Yield	2016 Yield	Two-Year Average	Stand 10/1/2017
FF42.A2	12.57	9.04	<b>10.85</b>	95
SW 5909	12.25	8.85	<b>10.54</b>	95
SW 5213**	12.14	8.33	<b>10.22</b>	94
FSG 426	11.84	8.56	<b>10.21</b>	95
4H400*	12.09	8.24	<b>10.19</b>	96
FSG 408DP	12.02	8.15	<b>10.09</b>	95
Persist III	11.48	8.64	<b>10.05</b>	95
Plus III	11.47	8.58	<b>10.04</b>	94
Vernal	11.79	8.15	<b>10.02</b>	95
428RR	11.92	8.07	<b>9.99</b>	95
ReNew+*	11.49	8.43	<b>9.99</b>	94
SW 5113**	11.77	7.76	<b>9.75</b>	96
SW 5512Y	11.01	8.00	<b>9.48</b>	94
5312**	10.88	7.53	<b>9.16</b>	94
FSG 415BR	10.12	7.14	<b>8.61</b>	93
Oneida VR	9.61	6.43	<b>7.95</b>	93
<b>GRAND MEAN</b>	<b>11.58</b>	<b>8.20</b>	<b>9.89</b>	<b>95</b>
<b>CV (%)</b>	<b>6.07</b>	<b>9.22</b>	<b>6.38</b>	<b>1.65</b>
<b>LSD (p = 0.05)</b>	<b>0.98</b>	<b>1.06</b>	<b>0.88</b>	<b>2.19</b>

\*Variety tested with experimental seed that may or may not give performance similar to commercially available seed.

\*\*Not commercially available.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded April 16, 2015.
- Yields are given in tons per acre (DM basis).
- Yields indicated represent four cuttings.
- Stand score based on a scale from 1 to 100. A 100 is considered a perfect stand.
- Grand mean, CV, and LSD values represent 28 total entries.
- Entries are ranked in order of decreasing yield based on the two-year average.
- Means are LSMeans derived from statistical analysis. Therefore, season or multiple-year totals may not be the arithmetic sum of individual cuts or years, respectively.

**Table 5. 2016 alfalfa variety trial—Rock Springs.**

Variety	2017 Yield	Stand 10/1/2017
SW 5213*	<b>11.07</b>	97
HiGest 360	<b>10.53</b>	97
SW 5210	<b>10.53</b>	96
WL 365 HQ	<b>10.45</b>	97
FF42.A2	<b>10.44</b>	98
SW 4107	<b>10.38</b>	97
KF-406 A2	<b>10.37</b>	97
LS 1302*	<b>10.36</b>	96
KF-425 HD	<b>10.17</b>	97
Rebound 6XT	<b>10.16</b>	97
GA-497 HD*	<b>10.15</b>	97
Rebound 6.0	<b>10.15</b>	98
Plus III	<b>9.68</b>	97
Persist III	<b>9.55</b>	97
Oneida VR	<b>8.93</b>	97
RR Vamoose	<b>8.75</b>	97
Vernal	<b>8.60</b>	97
<b>GRAND MEAN</b>	<b>10.09</b>	<b>97</b>
<b>CV (%)</b>	<b>8.08</b>	<b>1.06</b>
<b>LSD (p = 0.05)</b>	<b>1.14</b>	<b>1.43</b>

\*Experimental variety; not commercially available.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded August 19, 2016.
- Yields are given in tons per acre (DM basis).
- Yields indicated represent four cuttings.
- Stand score based on a scale from 1 to 100. A 100 is considered a perfect stand.
- Grand mean, CV, and LSD values represent 20 total entries.
- Entries are ranked in order of decreasing yield based on the year average.
- Means are LSMeans derived from statistical analysis. Therefore, season or multiple-year totals may not be the arithmetic sum of individual cuts or years, respectively.



**Table 6. 2013 alfalfa variety trial—Landisville.**

Variety	2017 Yield	2016 Yield	2015 Yield	2014 Yield	Four-Year Average	Stand 10/15/2017
55Q27	10.04	11.49	9.39	8.83	<b>10.32</b>	85
GA-535	9.68	11.47	10.33	8.57	<b>10.29</b>	86
Profusion 2HX*	9.78	10.63	9.48	9.73	<b>10.24</b>	85
FSG 403LR	9.17	10.89	9.58	8.84	<b>9.93</b>	85
FSG 524	9.70	11.29	9.06	8.37	<b>9.88</b>	85
Magnitude	9.66	10.33	10.26	7.32	<b>9.67</b>	85
FSG 408DP	9.08	10.48	9.60	8.05	<b>9.58</b>	84
L 455 HD	8.69	10.66	9.33	7.97	<b>9.46</b>	83
LS 905**	8.81	10.44	9.62	7.74	<b>9.37</b>	85
Mariner IV	8.78	9.52	9.68	8.18	<b>9.36</b>	84
55V50	8.64	9.72	9.36	8.36	<b>9.35</b>	84
DG 4210	8.48	9.90	8.94	7.49	<b>9.01</b>	85
DKA 41-18 RR	7.97	9.31	9.65	7.74	<b>8.97</b>	83
54QR04	8.50	9.90	9.04	7.65	<b>8.97</b>	84
428RR	8.53	9.84	8.40	7.78	<b>8.86</b>	85
5454**	7.84	9.08	9.14	7.72	<b>8.73</b>	84
55H94	8.00	8.38	9.48	7.36	<b>8.46</b>	82
5312**	7.43	7.83	9.27	7.78	<b>8.31</b>	85
Vernal	7.24	8.30	9.80	6.72	<b>8.28</b>	83
Oneida VR	6.97	8.14	9.68	7.10	<b>8.22</b>	86
<b>GRAND MEAN</b>	<b>8.68</b>	<b>9.90</b>	<b>9.35</b>	<b>8.05</b>	<b>9.27</b>	<b>84</b>
<b>CV (%)</b>	<b>10.13</b>	<b>11.00</b>	<b>13.44</b>	<b>9.68</b>	<b>6.87</b>	<b>2.53</b>
<b>LSD (p = 0.05)</b>	<b>1.23</b>	<b>1.52</b>	<b>1.76</b>	<b>1.09</b>	<b>0.89</b>	<b>3.00</b>

\*Variety tested with experimental seed that may or may not give performance similar to commercially available seed.

\*\*Experimental variety; not commercially available.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded April 5, 2013.
- Yields are given in tons per acre (DM basis).
- Yields indicated represent five cuttings.
- Stand score based on a scale from 1 to 100. A 100 is considered a perfect stand.
- Grand mean, CV, and LSD values represent 28 total entries.
- Entries are ranked in order of decreasing yield based on the four-year average.
- Means are LSMeans derived from statistical analysis. Therefore, season or multiple-year totals may not be the arithmetic sum of individual cuts or years, respectively.

**Table 7. 2014 alfalfa variety trial—Landisville.**

Variety	2017 Yield	2016 Yield	2015 Yield	Three-Year Average	Stand 10/15/2017
55Q27	11.43	11.51	12.87	<b>11.98</b>	96
AFX134089**	11.72	10.98	11.60	<b>11.50</b>	94
55V50	11.08	11.76	11.55	<b>11.44</b>	95
AFXA113010**	10.96	12.05	11.45	<b>11.24</b>	95
HiGest 360*	10.46	9.79	11.88	<b>10.97</b>	95
Persist III	10.96	9.83	10.87	<b>10.85</b>	95
55V12	9.69	10.95	11.98	<b>10.64</b>	94
DKA 41-18 RR	10.05	9.98	11.19	<b>10.34</b>	94
NY 13-30**	8.92	9.90	11.74	<b>10.08</b>	93
Oneida VR	9.74	8.86	11.14	<b>9.88</b>	96
Vernal	9.12	8.70	10.63	<b>9.19</b>	94
NY 1233/38**	8.14	7.80	10.10	<b>8.85</b>	93
<b>GRAND MEAN</b>	<b>10.19</b>	<b>10.18</b>	<b>11.42</b>	<b>10.58</b>	<b>95</b>
<b>CV (%)</b>	<b>12.88</b>	<b>15.06</b>	<b>6.59</b>	<b>8.77</b>	<b>1.26</b>
<b>LSD (p = 0.05)</b>	<b>1.84</b>	<b>2.15</b>	<b>1.05</b>	<b>1.30</b>	<b>1.67</b>

\*Variety tested with experimental seed that may or may not give performance similar to commercially available seed.

\*\*Experimental seed; not commercially available.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded April 5, 2014.
- Yields are given in tons per acre (DM basis).
- Yields indicated represent five cuttings.
- Stand score based on a scale from 1 to 100. A 100 is considered a perfect stand.
- Grand Mean, CV, and LSD values represent 12 total entries.
- Entries are ranked in order of decreasing yield based on the three-year average.
- Means are LSM means derived from statistical analysis. Therefore, season or multiple-year totals may not be the arithmetic sum of individual cuts or years, respectively.

**Table 8. 2015 alfalfa variety trial—Landisville.**

Variety	2017 Yield	2016 Yield	Two-Year Average	Stand 10/15/2017
FSG 408DP	10.88	11.20	<b>11.05</b>	96
SW 5909	11.30	10.62	<b>10.98</b>	95
Persist III	10.56	10.71	<b>10.65</b>	96
Plus III	10.49	10.41	<b>10.49</b>	96
428RR	10.39	10.62	<b>10.48</b>	97
NY 1429*	10.43	10.48	<b>10.47</b>	96
FF42.A2	10.30	10.49	<b>10.39</b>	97
FSG 426	9.84	10.80	<b>10.30</b>	97
SW 5512Y	10.41	10.21	<b>10.30</b>	96
NY 1428*	9.86	10.47	<b>10.12</b>	96
5312*	10.22	9.91	<b>10.10</b>	97
Oneida VR	10.17	9.94	<b>10.00</b>	96
<b>GRAND MEAN</b>	<b>10.51</b>	<b>10.49</b>	<b>10.50</b>	<b>96</b>
<b>CV (%)</b>	<b>9.90</b>	<b>7.10</b>	<b>8.04</b>	<b>1.29</b>
<b>LSD (p = 0.05)</b>	<b>1.46</b>	<b>1.04</b>	<b>0.98</b>	<b>1.74</b>

\*Experimental seed; not commercially available.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded April 15, 2015.
- Yields are given in tons per acre (DM basis).
- Yields indicated represent five cuttings.
- Stand score based on a scale from 1 to 100. A 100 is considered a perfect stand.
- Grand mean, CV, and LSD values represent 16 total entries.
- Entries are ranked in order of decreasing yield based on the two-year average.
- Means are LSMeans derived from statistical analysis. Therefore, season or multiple-year totals may not be the arithmetic sum of individual cuts or years, respectively.

**Table 9. 2016 alfalfa variety trial—Landisville.**

Variety	2017 Yield	Stand 10/15/2017
Persist III	<b>9.18</b>	96
KF-406 A2	<b>9.11</b>	96
Rebound 6XT	<b>9.08</b>	96
Oneida VR	<b>8.95</b>	97
WL 365 HQ	<b>8.94</b>	97
SW 5210	<b>8.94</b>	97
KF-425 HD	<b>8.88</b>	97
DKA 44-16 RR	<b>8.66</b>	96
Plus III	<b>8.51</b>	95
FF42.A2	<b>8.51</b>	97
GA-497 HD*	<b>8.49</b>	97
59W205*	<b>8.47</b>	96
DKA 40-51 RR	<b>7.95</b>	96
Vernal	<b>7.78</b>	96
<b>GRAND MEAN</b>	<b>8.82</b>	<b>96</b>
<b>CV (%)</b>	<b>12.07</b>	<b>1.37</b>
<b>LSD (p = 0.05)</b>	<b>1.11</b>	<b>1.84</b>

\*Experimental seed; not commercially available.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded April 15, 2016.
- Yields are given in tons per acre (DM basis).
- Yields indicated represent five cuttings.
- Stand score based on a scale from 1 to 100. A 100 is considered a perfect stand.
- Grand mean, CV, and LSD values represent 21 total entries.
- Entries are ranked in order of decreasing yield based on the year total.
- Means are LSMeans derived from statistical analysis. Therefore, season or multiple-year totals may not be the arithmetic sum of individual cuts or years, respectively.

## COOL-SEASON GRASSES

Tables 10 and 13 list cool-season perennial grass varieties in our testing program that are currently marketed in Pennsylvania or may be available in the near future (check with marketers for availability). Tables 11 through 12 and 14 through 17 offer guidelines for assessing the production potential of various grass varieties.

### Perennial Cool-Season Trial

Many farmers in Pennsylvania could benefit from including some cool-season grasses as an integral part of their forage program. The following tables summarize the yield potential of many perennial grass varieties in our research trials at Penn State's Russell E. Larson Research Center at Rock Springs.

Our soil fertility program is designed around maintenance applications of phosphorus and potash to meet the soil test requirements. Seventy pounds of available nitrogen is applied in early April with an additional 50 pounds applied after each harvest except the last one.

The first cutting in the perennial cool-season forage grass trials is made when an individual variety reaches mid-to late boot. Subsequent harvests are then made at intervals of 35 to 40 days, with the exception of the final harvest, when all plots are harvested on the same day. All plots are harvested four times throughout the growing season, weather permitting, except in the establishment year.

Although production for each cutting in a given year varies among species, most varieties produce one-third to one-half of the total annual production in the first cut. Yields are not greatly reduced if a three-cut system is used. Quality will be increased by early and frequent cutting. Choose a species that fits the farm's capabilities and the operator's management scheme. See the current *Penn State Agronomy Guide* for specific recommendations about establishment, fertilization, and other management considerations.

**Table 10. Cool-season grass varieties marketed in Pennsylvania and listed in this report.**

Species/Variety	Ploidy/Species	Marketer	Appears in Table No.
<b>MEADOW FESCUE</b>			
Cosmonaut	<i>Festuca pratensis</i>	Barenbrug	11
Liherold	<i>Festuca pratensis</i>	DSV-Eurograss	11
Pradel	<i>Festuca pratensis</i>	Barenbrug	11, 12
<b>TALL FESCUE</b>			
Bardelice	Fescue, Tall	Barenbrug	12
Bardoux	Fescue, Tall	Barenbrug	12
BarElite	Fescue, Tall	Barenbrug	11
Bariane	Fescue, Tall	Barenbrug	12
Dominate	Fescue, Tall	Allied Seed	11
FSG 402TF	Fescue, Tall	Allied Seed	11
Kentucky 31	Fescue, Tall	Public	11
Lipalma	Fescue, Tall	DSV-Eurograss	11
Tower	Fescue, Tall	DLF International Seeds	11
<b>FESTULOLIUM</b>			
Fedoro	Festulolium	DSV-Eurograss	11
Fojtan	Festulolium	DLF International Seeds	11
Mahulena	Festulolium	DLF International Seeds	11, 12
Rebab	Festulolium	DLF International Seeds	11
<b>ORCHARDGRASS</b>			
FSG 506OG		Allied Seed	11
Pennlate		P. L. Rohrer	11
<b>RYEGRASS</b>			
Albion	Tetraploid Perennial	Grassland Oregon	11
Aston Chieftain	Diploid Perennial	DSV-Eurograss	11
Barvitra	Tetraploid Perennial	Barenbrug	12
Boost	Tetraploid Perennial	Allied Seed	11
Intrada	Tetraploid Perennial	DSV-Eurograss	11
PayDay	Tetraploid Perennial	Mountain View Seeds	11, 12
Pomposo	Tetraploid Perennial	DSV-Eurograss	11
Remington	Tetraploid Perennial	Barenbrug	12
TetraPrime	Tetraploid Perennial	Mountain View Seeds	11
Toronto	Diploid Perennial	DSV-Eurograss	11

**Table 10** (continued).

Species/Variety	Ploidy/Species	Marketer	Appears in Table No.
<b>TIMOTHY</b>			
Climax		Allied Seed	11
Express II		Allied Seed	11
Presto		DSV-Eurograss	11
Barfleo		Barenbrug	12
Tenho		Barenbrug	12
<b>MIXES</b>			
Equi-Gold		American Grass Seed Producers	11
GrassPro	Tall Fescue (49.7%) Orchardgrass (35.1%) Timothy (11.7%)	King's AgriSeeds	11
Tri-Star	Tall Fescue (39.8%) Festulolium (33.0%) Orchardgrass (25.2%)	King's AgriSeeds	11

**Forage Grass Marketers Listed in This Report**

**Allied Seed, LLC**

Macon, MO 63552  
Phone: 800-880-8127  
www.alliedseed.com

**American Grass Seed Producers**

Tangent, OR 97389  
Phone: 541-926-4611  
www.agsp.us

**Barenbrug USA**

Tangent, OR 97389  
Phone: 541-926-5801  
www.barusa.com

**DLF International Seeds**

Halsey, OR 97348  
Phone: 800-445-2251  
www.intlseed.com

**DSV-Eurograss**

Lipstadt, Germany  
www.dsv-saaten.de

**Grassland Oregon**

Salem, OR 97305  
503-566-9900  
www.grasslandoregon.com

**King's AgriSeeds**

Ronks, PA 17572  
Phone: 717-687-6224  
www.kingsagriseeds.com

**Mountain View Seeds**

Salem, OR 97305  
Phone: 503-588-7333  
www.mtviewseeds.com

**P. L. Rohrer & Bro., Inc.**

Smoketown, PA 17576  
Phone: 717-299-2571  
www.rohrerseeds.com

**Table 11. 2014 cool-season grass variety trial—Rock Springs.**

	First Cut Date*	2017 Yield	2016 Yield	2015 Yield	Three-Year Average	Stand 10/15/2017	Crude Protein (%)	30-Hour NDFD
<b>MEADOW FESCUE</b>								
Liherold	5/16	6.52	3.77	5.23	<b>5.17</b>	92	13.5	44
Cosmonaut	5/19	6.12	3.69	5.57	<b>5.13</b>	93	14.6	49
Pradel	5/19	5.61	3.29	5.58	<b>4.83</b>	92	15.2	45
<b>GRAND MEAN</b>		<b>6.08</b>	<b>3.58</b>	<b>5.46</b>	<b>5.04</b>	<b>92</b>	<b>14.4</b>	<b>46</b>
<b>CV (%)</b>		<b>5.29</b>	<b>13.37</b>	<b>6.60</b>	<b>5.23</b>			
<b>LSD (p = 0.05)</b>		<b>0.56</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>			
<b>TALL FESCUE</b>								
Tower	5/16	8.68	4.37	8.13	<b>7.06</b>	98	13.6	43
FSG 402TF	5/8	8.95	4.93	7.25	<b>7.04</b>	98	14.1	45
SS-0705TFSL	5/16	9.49	4.48	7.16	<b>7.04</b>	95	12.6	41
Kentucky 31	5/16	8.83	4.29	7.55	<b>6.89</b>	95	12.9	42
DLFPS FTF 82**	5/8	8.58	4.76	7.27	<b>6.87</b>	98	14.1	44
DLFPS FTF 84**	5/16	8.99	4.40	7.09	<b>6.83</b>	98	12.4	42
FAF3/08-139**	5/16	8.51	4.47	7.29	<b>6.76</b>	98	12.4	43
Dominate	5/8	8.49	4.57	6.76	<b>6.60</b>	97	13.3	43
BarElite	5/16	8.27	4.67	6.47	<b>6.47</b>	98	13.9	43
BAR FAF 131**	5/16	8.53	4.39	6.36	<b>6.43</b>	98	12.2	38
BAR FABLD**	5/16	8.43	4.04	6.70	<b>6.39</b>	98	14.1	44
Lipalma	5/8	8.11	4.23	6.71	<b>6.35</b>	98	13.3	43
<b>GRAND MEAN</b>		<b>8.65</b>	<b>4.47</b>	<b>7.06</b>	<b>6.73</b>	<b>97</b>	<b>13.3</b>	<b>43</b>
<b>CV (%)</b>		<b>3.75</b>	<b>12.17</b>	<b>7.79</b>	<b>4.53</b>			
<b>LSD (p = 0.05)</b>		<b>0.47</b>	<b>0.78</b>	<b>0.79</b>	<b>0.44</b>			
<b>FESTULOLIUM</b>								
Mahulena	5/8	8.71	4.71	7.51	<b>6.97</b>	98	12.8	43
Rebab	5/16	8.09	3.90	6.32	<b>6.10</b>	97	14.0	46
Fojtan	5/16	8.48	3.94	5.84	<b>6.09</b>	96	13.1	44
Fedoro	5/19	6.99	3.28	6.03	<b>5.43</b>	92	12.9	47
GO-13GX**	5/16	6.76	3.37	4.64	<b>4.92</b>	95	14.9	48
<b>GRAND MEAN</b>		<b>7.80</b>	<b>3.84</b>	<b>6.07</b>	<b>5.90</b>	<b>96</b>	<b>13.5</b>	<b>46</b>
<b>CV (%)</b>		<b>6.54</b>	<b>8.51</b>	<b>8.34</b>	<b>3.52</b>			
<b>LSD (p = 0.05)</b>		<b>0.79</b>	<b>0.50</b>	<b>0.78</b>	<b>0.32</b>			
<b>ORCHARDGRASS</b>								
FSG 506OG	5/8	8.26	5.59	6.84	<b>6.90</b>	93	14.2	49
Blizzard	5/8	7.93	5.09	6.76	<b>6.60</b>	92	14.5	48
Pennlate	5/8	8.20	5.16	6.30	<b>6.55</b>	93	14.0	44
<b>GRAND MEAN</b>		<b>8.13</b>	<b>5.28</b>	<b>6.63</b>	<b>6.68</b>	<b>93</b>	<b>14.2</b>	<b>47</b>
<b>CV (%)</b>		<b>6.35</b>	<b>5.39</b>	<b>8.55</b>	<b>5.56</b>			
<b>LSD (p = 0.05)</b>		<b>ns</b>	<b>0.49</b>	<b>ns</b>	<b>ns</b>			

*Continued*

**Table 11** (continued).

	First Cut Date*	2017 Yield	2016 Yield	2015 Yield	Three-Year Average	Stand 10/15/2017	Crude Protein (%)	30-Hour NDFD
<b>RYEGRASS</b>								
TetraPrime	5/31	7.14	3.36	6.15	<b>5.55</b>	94	10.2	42
Aston Chieftain	5/31	7.73	3.06	4.98	<b>5.26</b>	94	13.3	50
PayDay	5/31	6.62	2.93	5.33	<b>4.96</b>	95	11.2	46
Albion	6/5	6.71	2.58	5.29	<b>4.86</b>	93	11.1	46
Boost	5/19	5.96	3.70	4.91	<b>4.86</b>	95	14.5	49
GO-AX-11**	5/19	5.82	3.69	4.78	<b>4.76</b>	93	14.6	53
GO-13AXT**	5/31	6.15	3.10	5.02	<b>4.76</b>	95	12.4	46
Pomposo	5/31	6.40	2.68	5.17	<b>4.75</b>	93	12.0	51
Toronto	5/19	5.69	2.70	5.73	<b>4.71</b>	94	12.9	49
Intrada	5/19	5.12	2.95	5.69	<b>4.59</b>	94	13.8	51
<b>GRAND MEAN</b>		<b>6.34</b>	<b>3.07</b>	<b>5.31</b>	<b>4.90</b>	<b>94</b>	<b>12.6</b>	<b>48</b>
<b>CV (%)</b>		<b>6.52</b>	<b>13.54</b>	<b>9.38</b>	<b>4.92</b>			
<b>LSD (p = 0.05)</b>		<b>0.60</b>	<b>0.63</b>	<b>0.72</b>	<b>0.35</b>			
<b>TIMOTHY</b>								
Express II	5/31	7.46	5.49	7.21	<b>6.72</b>	95	10.5	40
Climax	5/31	6.88	4.90	6.68	<b>6.15</b>	95	11.9	42
Presto	5/31	6.93	4.86	6.38	<b>6.06</b>	95	11.1	38
<b>GRAND MEAN</b>		<b>7.09</b>	<b>5.08</b>	<b>6.76</b>	<b>6.31</b>	<b>95</b>	<b>11.2</b>	<b>40</b>
<b>CV (%)</b>		<b>5.68</b>	<b>8.05</b>	<b>6.21</b>	<b>5.23</b>			
<b>LSD (p = 0.05)</b>		<b>ns</b>	<b>ns</b>	<b>0.73</b>	<b>0.58</b>			
<b>MIXES</b>								
GrassPro	5/16	9.01	4.92	6.45	<b>6.79</b>	95	13.9	46
Tri-Star	5/8	8.45	4.54	5.97	<b>6.32</b>	95	14.3	49
BAR FAFP**	5/16	7.89	3.96	6.14	<b>6.00</b>	95	13.0	44
Equi-Gold	5/16	6.92	4.52	5.30	<b>5.58</b>	95	13.6	42
<b>GRAND MEAN</b>		<b>8.07</b>	<b>4.49</b>	<b>5.97</b>	<b>6.17</b>	<b>95</b>	<b>13.7</b>	<b>45</b>
<b>CV (%)</b>		<b>4.01</b>	<b>10.76</b>	<b>7.53</b>	<b>4.75</b>			
<b>LSD (p = 0.05)</b>		<b>0.52</b>	<b>0.77</b>	<b>0.72</b>	<b>0.47</b>			
<b>OVERALL</b>								
<b>GRAND MEAN</b>		<b>7.56</b>	<b>4.08</b>	<b>6.21</b>	<b>5.95</b>	<b>95</b>		
<b>CV (%)</b>		<b>6.60</b>	<b>12.74</b>	<b>8.02</b>	<b>5.63</b>	<b>4.76</b>		
<b>LSD (p = 0.05)</b>		<b>0.70</b>	<b>0.73</b>	<b>0.70</b>	<b>0.47</b>	<b>2.22</b>		

\*Date when the first cutting was made in 2017. First cutting was made at the early boot stage.

\*\*Entries are experimental and not currently marketed.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded April 21, 2014.
- Yields are given in tons per acre (DM basis).
- Overall grand mean, CV, and LSD values represent 40 total entries.
- Variety means are means derived from LSM means.
- Yields indicated represent the sum of four cuttings.

**Table 12. 2015 cool-season grass variety trial—Rock Springs.**

	First Cut Date*	2017 Yield	2016 Yield	Two-Year Average	Stand 10/15	Crude Protein (%)	30-Hour NDFD
<b>MEADOW FESCUE</b>							
Pradel	5/19	6.92	6.29	<b>6.60</b>	96	10.8	32
DSV 15-12**	5/16	6.34	5.83	<b>6.09</b>	95	13.8	49
BAR FPF32**	5/19	6.33	5.68	<b>6.00</b>	94	13.1	49
<b>GRAND MEAN</b>		<b>6.53</b>	<b>5.93</b>	<b>6.23</b>	<b>95</b>	<b>12.6</b>	<b>43</b>
<b>CV (%)</b>		<b>4.52</b>	<b>7.02</b>	<b>2.74</b>	<b>8.55</b>		
<b>LSD (p = 0.05)</b>		<b>0.51</b>	<b>0.61</b>	<b>0.30</b>	<b>1.41</b>		
<b>TALL FESCUE</b>							
DLFPS-FTF-73**	5/16	9.98	7.58	<b>8.78</b>	96	12.5	43
Bardoux	5/19	9.31	7.45	<b>8.38</b>	95	12.4	44
DLFPS-FTF-70**	5/16	9.40	6.65	<b>8.03</b>	94	13.3	47
BAR FA 13131**	5/16	8.92	7.00	<b>7.96</b>	93	12.9	43
Bardelice	5/19	8.19	6.94	<b>7.57</b>	96	13.1	45
Bariane	5/19	8.20	6.22	<b>7.21</b>	95	13.8	46
<b>GRAND MEAN</b>		<b>9.00</b>	<b>6.98</b>	<b>7.99</b>	<b>95</b>	<b>13.0</b>	<b>45</b>
<b>CV (%)</b>		<b>6.25</b>	<b>5.31</b>	<b>5.39</b>	<b>8.03</b>		
<b>LSD (p = 0.05)</b>		<b>0.85</b>	<b>0.56</b>	<b>0.65</b>	<b>1.88</b>		
<b>FESTULOLIUM</b>							
Mahulena		10.49	7.20	<b>8.85</b>	96	14.8	47
<b>GRAND MEAN</b>		<b>10.49</b>	<b>7.20</b>	<b>8.85</b>	<b>96</b>	<b>14.8</b>	<b>47</b>
<b>CV (%)</b>			<b>na</b>	<b>na</b>	<b>na</b>	<b>na</b>	<b>na</b>
<b>LSD (p = 0.05)</b>			<b>na</b>	<b>na</b>	<b>na</b>	<b>na</b>	<b>na</b>
<b>ORCHARDGRASS</b>							
Bounty II	5/8	8.96	7.79	<b>8.38</b>	96	14.5	53
DSV 15-10**	5/16	8.53	6.62	<b>7.57</b>	95	12.4	48
DSV 15-11**	5/8	7.98	6.86	<b>7.42</b>	94	14.8	56
DSV 15-09**	5/16	7.59	6.04	<b>6.81</b>	96	12.1	51
<b>GRAND MEAN</b>		<b>8.27</b>	<b>6.83</b>	<b>7.54</b>	<b>95</b>	<b>13.4</b>	<b>52</b>
<b>CV (%)</b>		<b>5.89</b>	<b>4.90</b>	<b>3.61</b>	<b>9.24</b>		
<b>LSD (p = 0.05)</b>		<b>0.78</b>	<b>0.54</b>	<b>0.44</b>	<b>0.88</b>		
<b>RYEGRASS</b>							
Remington	5/31	7.51	7.62	<b>7.56</b>	94	11.2	46
LPTNEAROM**	5/31	7.19	7.79	<b>7.49</b>	96	10.7	46
DSV 15-03**	5/31	6.89	7.72	<b>7.30</b>	96	11.3	39
DSV 15-05**	6/5	7.59	6.63	<b>7.11</b>	95	11.6	43
Barvitra	5/19	5.64	8.39	<b>7.01</b>	95	16.3	49
DSV 15-06**	5/31	6.67	7.14	<b>6.90</b>	95	11.6	41
DSV 15-02**	5/31	6.61	7.16	<b>6.88</b>	94	10.7	45
DSV 15-04**	6/5	7.36	6.23	<b>6.80</b>	94	9.6	40
DSV 15-01**	5/31	6.76	6.57	<b>6.66</b>	95	10.6	45
PayDay	5/19	5.65	6.90	<b>6.28</b>	94	13.1	51
<b>GRAND MEAN</b>		<b>6.79</b>	<b>7.21</b>	<b>7.00</b>	<b>95</b>	<b>11.7</b>	<b>44</b>
<b>CV (%)</b>		<b>6.10</b>	<b>4.40</b>	<b>3.91</b>	<b>6.11</b>		
<b>LSD (p = 0.05)</b>		<b>0.60</b>	<b>0.46</b>	<b>0.40</b>	<b>0.95</b>		



**Table 12** (continued).

	First Cut Date*	2017 Yield	2016 Yield	Two-Year Average	Stand 10/15	Crude Protein (%)	30-Hour NDFD
<b>TIMOTHY</b>							
DSV 15-08**	5/31	9.18	6.81	<b>7.99</b>	98	10.8	32
Tenho	6/5	8.98	6.67	<b>7.83</b>	95	11.3	43
Barfleo	5/31	7.67	7.30	<b>7.49</b>	94	10.9	39
DSV 15-07**	5/31	7.66	7.00	<b>7.33</b>	94	10.6	37
<b>GRAND MEAN</b>		<b>8.37</b>	<b>6.95</b>	<b>7.66</b>	<b>95</b>	<b>10.9</b>	<b>37</b>
<b>CV (%)</b>		<b>4.03</b>	<b>4.46</b>	<b>3.44</b>	<b>6.24</b>		
<b>LSD (p = 0.05)</b>		<b>0.54</b>	<b>0.50</b>	<b>0.42</b>	<b>2.00</b>		
<b>OVERALL</b>							
<b>GRAND MEAN</b>		<b>7.80</b>	<b>6.93</b>	<b>7.37</b>	<b>96</b>		
<b>CV (%)</b>		<b>5.85</b>	<b>5.65</b>	<b>4.41</b>	<b>0.85</b>		
<b>LSD (p = 0.05)</b>		<b>0.65</b>	<b>0.55</b>	<b>0.46</b>	<b>1.20</b>		

\*Date when the first cutting was made in 2017. First cutting was made at the early boot stage.

\*\*Experimental entries that are not currently marketed.

**CV** = coefficient of variation

**LSD** = least significant difference

- Seeded September 1, 2015.
- Yields are given in tons per acre (DM basis).
- Overall grand mean, CV, and LSD values represent 29 total entries.
- Variety means are means derived from LSMeans.
- Yields indicated represent the sum of four cuttings.

## 2016–2017 Short-Lived Cool-Season Grass Trial

In fall 2016, a Short-Lived Cool-Season Grass Trial was seeded at Rock Springs. The trial was planted on September 15, 2016. There were two different management treatments: a single-cut system and a multi-cut system. The cereal grasses were cut using the single-cut system and the annual ryegrasses were cut using the multi-cut system. Some of the ryegrass varieties were entered in both cutting systems. With the multi-cut system, grasses were cut about every three weeks and the plots were cut three different times based on maturity. The first cut was taken at flag leaf (target 20 inches). The varieties in the single-cut system were cut when they reached the early to mid-boot stage. Cutting started on May 2 and was completed June 13. Our soil fertility program is designed around maintenance applications of phosphorus and potash to meet soil test requirements. Plots received 30 units in the fall, 100 units of nitrogen in the spring at green-up, and for the multi-cut system, 50 units after each cutting. See the current *Penn State Agronomy Guide* for specific recommendations about establishment, fertilization, and other management considerations.

**Table 13. Short-Lived grass varieties listed in this report.**

Variety	Species	Marketer	Appears in Table No.
<b>ANNUAL RYEGRASS</b>			
Andes	Annual Ryegrass	DLF Pickseed	14
Centurion	Annual Ryegrass	Mountain View Seeds	14, 15
Jackson	Annual Ryegrass	Wax Company	14, 15
JUMBO	Annual Ryegrass	Barenbrug USA	14
Kodiak	Annual Ryegrass	DLF Pickseed	14
Marshall	Annual Ryegrass	Wax Company	14, 15
McKinley	Annual Ryegrass	DLF Pickseed	14
ME-4	Annual Ryegrass	Wax Company	15
MO-1	Annual Ryegrass	DLF Pickseed	14
Nelson	Annual Ryegrass	Wax Company	14, 15
Winterhawk	Annual Ryegrass	OreGro	14
<b>CEREALS</b>			
Aroostook	Rye	Public	16
Bolt	Triticale	King's AgriSeeds	16
Bonfire	Rye	DSV-Eurograss	16
HyOctane	Triticale	SEEDWAY	16
Traction	Triticale	GROWMARK FS	16
Trical 336	Triticale	SEEDWAY	16
Trical 815	Triticale	King's AgriSeeds	16
Trical Gainer 154	Triticale	King's AgriSeeds	16
<b>Mix</b>			
Soil Builder Plus		King's AgriSeeds	17

### Forage Grass Marketers Listed in This Report

#### Barenbrug USA

Tangent, OR 97321  
Phone: 541-926-5801  
www.barusa.com

#### DLF Pickseed

Halsey, OR 97348  
Phone: 800-445-2251  
www.pickseed.com

#### DSV-Eurograss

Lipstadt, Germany  
www.dsv-saaten.de

#### GROWMARK FS

York, PA 17402  
Phone: 800-338-4769  
www.growmarkfs.com

#### King's AgriSeeds

Ronks, PA 17572  
Phone: 717-687-6224  
kingsagriseeds.com

#### Mountain View Seeds

Salem, OR 97305  
Phone: 503-588-7333  
www.mtviewseeds.com

#### OreGro

Albany OR 97322  
Phone: 541-258-1001  
www.oregroseeds.com

#### SEEDWAY

Mifflinburg, PA 17844  
Phone: 800-338-2137  
www.seedway.com

#### Wax Company

Amory, MS 38821  
Phone: 662-256-3511

**Table 14. Annual ryegrass—multiple cut.**

Variety	Harvest Date	DM Yield (tons per acre)				First Cut Analysis	
		Cut 1	Cut 2	Cut 3	Total	Crude Protein (%)	30-Hour NDFD
Kodiak	4/28, 5/19, 6/9	2.59	0.89	1.42	<b>4.90</b>	22.3	74
MO-1	4/28, 5/19, 6/9	2.41	0.88	1.55	<b>4.84</b>	23.8	74
Centurion	4/28, 5/19, 6/9	2.29	0.93	1.62	<b>4.84</b>	22.3	71
McKinley	4/28, 5/19, 6/9	2.53	0.83	1.44	<b>4.81</b>	24.9	73
Andes	4/28, 5/19, 6/9	2.14	1.21	1.28	<b>4.64</b>	23.8	72
Winterhawk	4/28, 5/19, 6/9	2.15	1.11	1.27	<b>4.53</b>	22.4	70
Jackson	4/28, 5/19, 6/9	2.42	0.78	1.32	<b>4.52</b>	23.0	72
Marshall	4/28, 5/19, 6/9	2.07	0.88	1.51	<b>4.47</b>	22.1	71
JUMBO	4/28, 5/19, 6/9	1.63	1.31	1.09	<b>4.02</b>	26.0	77
Nelson	4/28, 5/19, 6/9	1.97	0.85	1.08	<b>3.90</b>	23.0	76
<b>GRAND MEAN</b>		<b>1.82</b>	<b>1.07</b>	<b>1.31</b>	<b>4.20</b>	<b>24.0</b>	<b>75</b>
<b>CV (%)</b>		<b>7.88</b>	<b>8.49</b>	<b>8.78</b>	<b>5.16</b>		
<b>LSD (p = 0.05)</b>		<b>0.20</b>	<b>0.13</b>	<b>0.16</b>	<b>0.30</b>		

CV = coefficient of variation

LSD = least significant difference

- Planted September 15, 2016.
- Yields are given in tons per acre (DM basis).
- Stand score based on a scale of 1 to 100. A 100 is considered a perfect stand.
- Grand mean, CV, and LSD values represent 32 total entries.
- Means are LSMMeans derived from statistical analysis.
- Rankings are based on total yields.

**Table 15. Annual ryegrass—single cut.**

Variety	Harvest Date	DM Yield (tons per acre)	First Cut Analysis	
			CP (%)	30-Hour NDFD
Jackson	5/8	<b>3.55</b>	19.4	62
ME-4*	5/8	<b>3.44</b>	18.3	64
Centurion	5/11	<b>3.37</b>	18.0	67
Marshall	5/8	<b>3.11</b>	15.2	63
Nelson	5/8	<b>2.81</b>	15.9	59
<b>GRAND MEAN</b>		<b>3.17</b>		
<b>CV (%)</b>		<b>10.88</b>		
<b>LSD (p = 0.05)</b>		<b>0.36</b>		

\*Not commercially available.

CV = coefficient of variation

LSD = least significant difference

- Planted September 15, 2016.
- Yields are given in tons per acre (DM basis).
- Grand mean, CV, and LSD values represent 10 total entries.
- Means are LSMMeans derived from statistical analysis.
- Rankings are based on total yields.

**Table 16. Short-season cereals.**

Variety	Species	Harvest Date	Yield	First Cut Analysis	
				Crude Protein (%)	30-Hour NDFD
HyOctane	Triticale	5/5	<b>4.60</b>	13.2	54
Trical 336	Triticale	5/5	<b>4.53</b>	12.7	57
Bolt	Triticale	5/5	<b>4.18</b>	13.6	60
Traction	Triticale	5/5	<b>4.15</b>	14.8	58
Trical Gainer 154	Triticale	4/30	<b>4.03</b>	17.8	59
Trical 815	Triticale	4/30	<b>3.74</b>	18.4	59
Aroostook	Rye	4/20	<b>3.12</b>	22.1	64
Bonfire	Rye	4/20	<b>3.03</b>	19.8	64
<b>GRAND MEAN</b>			<b>3.85</b>	<b>16.2</b>	<b>58</b>
<b>CV (%)</b>			<b>4.59</b>		
<b>LSD (p = 0.05)</b>			<b>0.25</b>		

CV = coefficient of variation

LSD = least significant difference

- Planted September 15, 2016.
- Yields are given in tons per acre (DM basis).
- Stand score based on a scale of 1 to 100. A 100 is considered a perfect stand.
- Grand mean, CV, and LSD values represent 16 total entries.
- Means are LSMeans derived from statistical analysis.
- Rankings are based on total yields.

**Table 17. Short-season mix.**

Variety	Species	Harvest Date	Yield	First Cut Analysis	
				Crude Protein (%)	30-Hour NDFD
King's Soil Builder Plus	Trical 815 (66.7%)	5/6	<b>3.46</b>	16.1	62
	Crimson clover (11.7%)				
	Hairy vetch (10%)				
	Annual ryegrass (10%)				
	Daikon radish (1.5%)				

- Planted September 15, 2016.
- Yield given in tons per acre (DM basis).

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