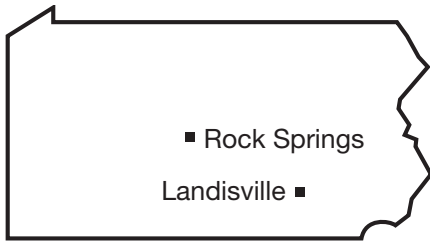
PennState Extension

2019 FORAGE TRIALS REPORT

SUMMARY

The 2019 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/or the Southeast Research and Extension Center at Landisville.



Forage Growing Conditions and Insect Pressure in 2019

Early spring was spent trying to dry out from the deluge that 2018 was. Weather in April for forage planting was relatively normal across much of Pennsylvania. From the onset of May until the end and into June it rained frequently and the opportunity to harvest the first cutting was delayed in many cases. Field curing first cutting hay was probably not in the cards. Wet soils resulted in soil compaction during harvesting of many fields and the assumption may well have been that the year would be a repeat of the year before. July was relatively normal, but extended hot, dry conditions from early August until late September were ideal for field curing forage crops. On the flip side, though there were a handful of small rain events sprinkled throughout, forage yields suffered from droughty conditions in the latter part of the season. The rain returned in October, which brought welcomed moisture as staple forage crops remobilized energy to their roots to prepare for dormancy. The added precipitation was also helpful in getting fall-planted crops growing if planting was timed well.

Potato leafhopper infestations were prevalent starting in early to mid-June and were high across most of the state. Leaf diseases and leaf mites continue to be a problem for grass production in some areas. Unfortunately, these areas seem to be expanding annually and the effect was real, even at our research facility.

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 12). 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, 11, and 13 through 17. Although the trials contain up to 58 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 because 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 0.50 ton per acre higher in yield than variety B, then this difference is statistically significant if the LSD is 0.50 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.

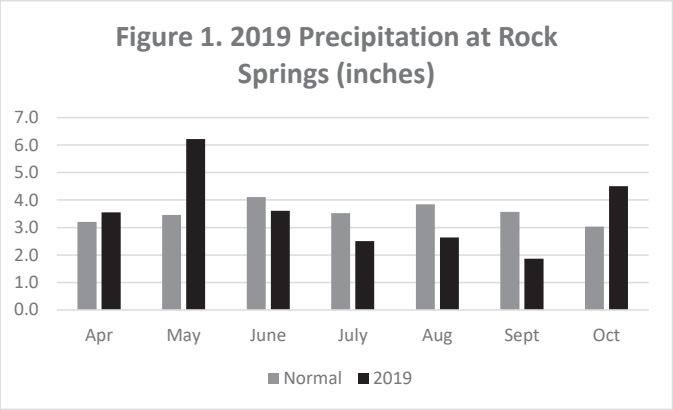


Figure 1. 2019 Precipitation at Rock Springs (inches)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Apr
May
June
July
Aug
Sept
Oct
Normal
2019

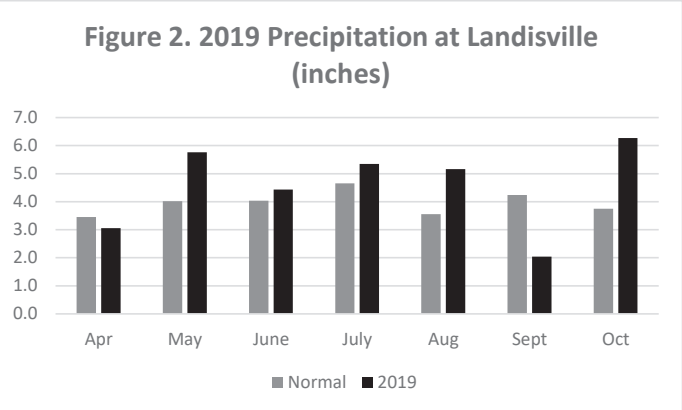


Figure 2. 2019 Precipitation at Landisville (inches)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Apr
May
June
July
Aug
Sept
Oct
Normal
2019

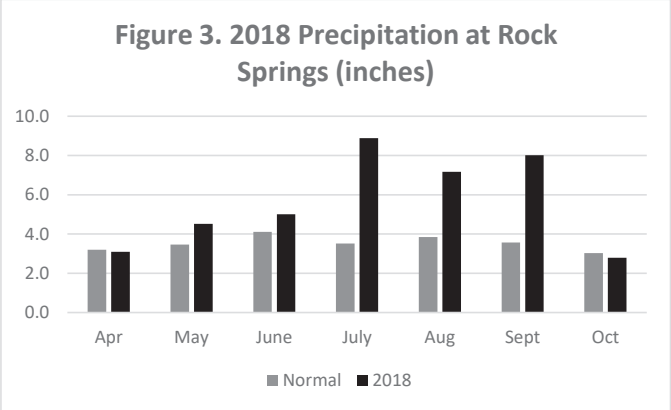


Figure 3. 2018 Precipitation at Rock Springs (inches)
10.0
8.0
6.0
4.0
2.0
0.0
Apr
May
June
July
Aug
Sept
Oct
Normal
2018

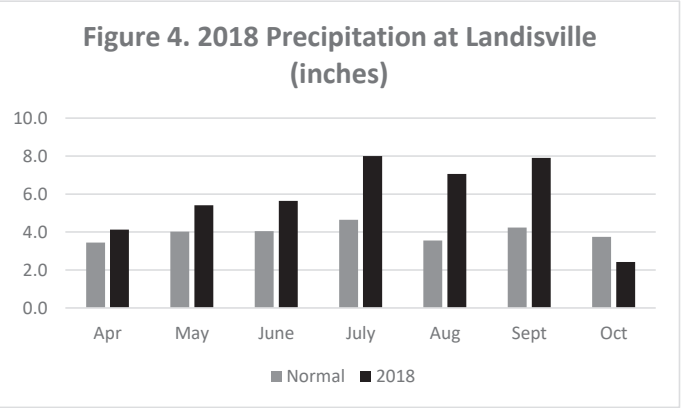


Figure 4. 2018 Precipitation at Landisville (inches)
10.0
8.0
6.0
4.0
2.0
0.0
Apr
May
June
July
Aug
Sept
Oct
Normal
2018

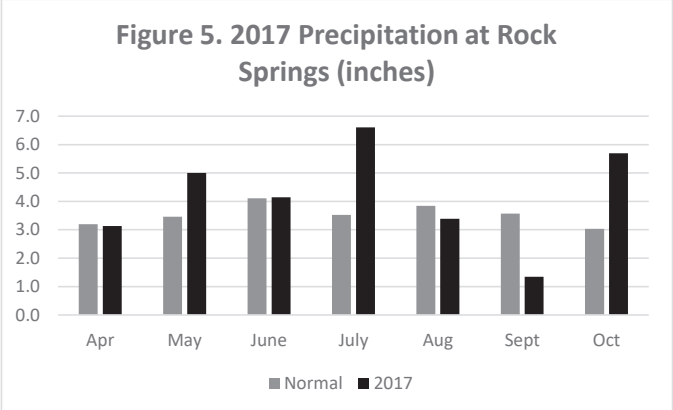


Figure 5. 2017 Precipitation at Rock Springs (inches)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Apr
May
June
July
Aug
Sept
Oct
Normal
2017

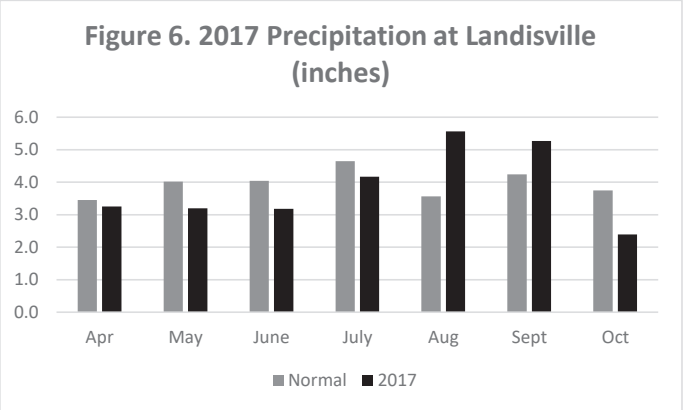


Figure 6. 2017 Precipitation at Landisville (inches)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Apr
May
June
July
Aug
Sept
Oct
Normal
2017

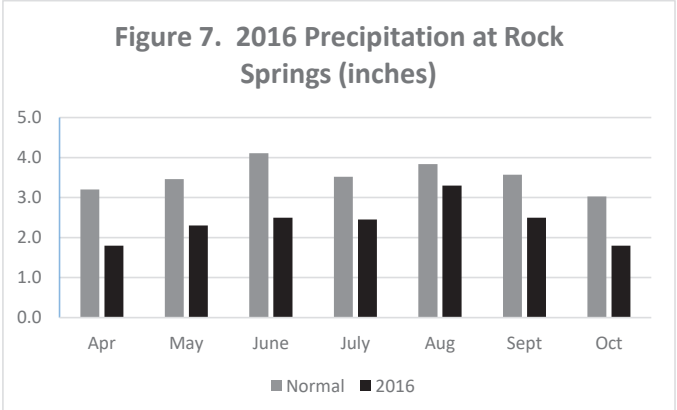


Figure 7. 2016 Precipitation at Rock Springs (inches)
5.0
4.0
3.0
2.0
1.0
0.0
Apr
May
June
July
Aug
Sept
Oct
Normal
2016

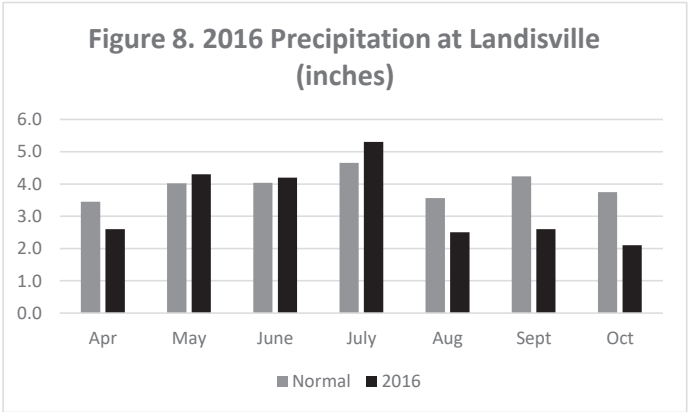


Figure 8. 2016 Precipitation at Landisville (inches)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Apr
May
June
July
Aug
Sept
Oct
Normal
2016

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 are 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 trial site 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%; **LR** = 6 to 14%; **MR** = 15 to 30%; **R** = 31 to 50%; **HR** = 51% or greater. If the resistance rating for a variety is not listed, the information is not available.

Variety	Marketer	Fall Dormancy	Pest Resistance Ratings						Appears in Table No.
			BW	VW	FW	AN	PRR	APH1	
AFX 469	Alforex Seeds	4	HR	HR	HR	HR	HR	HR	4, 8
Hi-Gest 360	Alforex Seeds	3	HR	HR	HR	HR	HR	HR	3
Hi-Gest 460	Alforex Seeds	4	HR	HR	HR	HR	HR	HR	5, 8, 9
Hybriforce-3420-Wet	Alforex Seeds	4	HR	HR	HR	HR	HR	HR	7
Hybriforce-3430	Alforex Seeds	4	HR	HR	HR	HR	HR	HR	7
Hybriforce-4400	Alforex Seeds	4	HR	HR	HR	HR	HR	HR	5, 7, 8, 9
KF-406 A2	Byron Seeds, LLC	4	HR	HR	HR	HR	HR	HR	7
KF-425 HD	Byron Seeds, LLC	4	HR	HR	HR	HR	HR	HR	7
Gemstone II	Chemgro Seeds	4	HR	HR	HR	HR	HR	HR	5
Rebound 6.0	Croplan	4	HR	HR	HR	HR	HR	HR	3
Rebound 6XT	Croplan	4	HR	HR	HR	HR	HR	HR	7
RR VaMoose	Croplan	4	HR	HR	HR	HR	HR	HR	3
DKA 40-51RR	Dekalb	4	HR	HR	HR	HR	HR	HR	7
DKA 44-16RR	Dekalb	4	HR	HR	HR	HR	HR	HR	7
FF42.A2	LaCrosse Seed	4	HR	HR	HR	HR	HR	HR	3, 6
Touchstone EQ	Legacy Seeds	4	HR	HR	HR	HR	HR	HR	5, 9
55V50	Pioneer Hi-Bred	5	HR	HR	R	HR	HR	HR	2, 4, 8, 9
Vernal	Public	4	R	S	MR	S	S	S	2, 3, 4, 7, 8, 9
Oneida VR	Public	3	R	HR	HR	MR	MR		3, 4, 6, 7, 8, 9
SW 5512Y	S&W Seed Co.	5	HR	HR	HR	HR	HR	HR	6
SW 5909	S&W Seed Co.	5	HR	HR	HR	HR	HR	HR	3, 6
SW 4113	S&W Seed Co.	4	HR	HR	R	HR	HR	HR	3, 6
SW 5213	S&W Seed Co.	5	HR	HR	HR	HR	HR	HR	3, 6, 7
SW 4107	S&W Seed Co.	4	HR	HR	HR	HR	HR	HR	4, 5, 8, 9
SW 5210	S&W Seed Co.	5	HR	HR	HR	HR	HR	HR	4, 7, 8
Persist III	Seed Consultants	4	HR	HR	HR	HR	HR	HR	2, 3, 5, 6, 7, 9
Plus III	Seed Consultants	4	HR	HR	HR	HR	HR	HR	3, 5, 6, 9
430RRLH	Seedway	4	HR	HR	HR	HR	HR	HR	9
FSG 408DP	Seedway	4	HR	HR	HR	HR	HR	HR	3, 6
FSG 426	Seedway	4	HR	HR	HR	HR	HR	HR	3, 6, 8
FSG 415BR	Seedway	4	HR	HR	HR	HR	HR	HR	
FSG 428RR	Seedway/Growmark FS	4	HR	HR	HR	HR	HR	HR	3, 6
WL 365 HQ	W-L Alfalfas	5	HR	HR	HR	HR	HR	HR	7

Alfalfa Marketers Listed in This Report

Alforex Seeds
Woodland, CA 95695
Phone: 530-666-3331
www.alforexseeds.com

Brett-Young Seeds
Winnipeg, MB M3V 1L5, Canada
Phone: 204-261-7932
www.byseeds.com

Byron Seeds, LLC
Rockville, IN 47872
Phone: 765-569-3555
www.byronseeds.net

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

Croplan
St. Paul, MN 55164
www.croplan.com

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

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

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

Mycogen Seeds
Indianapolis, IN 46268
www.mycogen.com

Pioneer Hi-Bred Int'l, Inc.
Mount Joy, PA 17552
Phone: 717-653-5605
www.pioneer.com

S&W Seed Co.
Fresno CA 93720
Phone: 559-884-2535
www.swseedco.com

Seed Consultants
Washington Court House, OH 43160
Phone: 800-708-2676
www.seedconsultants.com

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

T.A. Seeds/Local Seeds
Jersey Shore, PA 17740
Phone: 570-753-17740
www.localseeds.com

W-L Research
Ozark, MO. 65721
www.wlalfalfas.com

Table 2. 2015 alfalfa variety trial—Rock Springs.

Variety	2019 Yield	2018 Yield	2017 Yield	2016 Yield	Four-year Average	Stand 10/28/19
FF42.A2	8.08	10.44	12.57	9.04	**10.09**	95
SW 5909	8.20	10.58	12.25	8.85	**9.98**	95
SW 5213	8.16	10.40	12.14	8.33	**9.74**	95
Vernal	8.07	9.98	11.79	8.15	**9.61**	95
FSG 426	7.88	10.19	11.84	8.56	**9.60**	95
Mariner V*	7.97	9.94	11.49	8.43	**9.50**	94
FSG 428RR	7.67	9.95	11.92	8.07	**9.45**	95
Plus III	7.86	10.10	11.47	8.58	**9.45**	94
4H400*	7.38	9.67	12.09	8.24	**9.39**	94
SW 4113	8.12	9.77	11.77	7.76	**9.38**	95
FSG 408DP	6.85	9.25	12.02	8.15	**9.08**	92
Persist III	6.76	8.79	11.48	8.64	**8.86**	94
SW 5512Y	5.59	7.97	11.01	8.00	**8.12**	92
5312**	5.41	7.77	10.88	7.53	**7.90**	91
FSG 415BR	6.09	7.69	10.12	7.14	**7.72**	92
Oneida VR	5.15	7.15	9.61	6.43	**6.99**	92
GRAND MEAN	**7.28**	**9.36**	**11.58**	**8.20**	**9.10**	**94**
CV (%)	**7.55**	**8.34**	**6.07**	**9.22**	**6.23**	**1.34**
LSD (p = 0.05)	**0.77**	**1.09**	**0.98**	**1.06**	**0.79**	**1.76**

*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 to be 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 3. 2016 alfalfa variety trial—Rock Springs.

Variety	2019 Yield	2018 Yield	2017 Yield	Three-year Average	Stand 10/28/2019
Rebound 6XT	8.74	10.81	10.16	**9.93**	94
SW 5213	7.89	10.71	11.07	**9.90**	95
SW 5210	8.42	10.64	10.53	**9.89**	94
WL 365 HQ	8.44	10.57	10.45	**9.84**	95
FF42.A2	8.05	10.37	10.44	**9.63**	94
SW 4107	7.99	10.43	10.38	**9.62**	94
KF-425 HD	7.86	10.25	10.17	**9.43**	93
4A425*	8.06	9.91	9.87	**9.29**	95
LS 1302*	7.62	9.75	10.36	**9.24**	94
Plus III	7.98	9.96	9.68	**9.23**	94
KF-406 A2	7.38	9.50	10.37	**9.12**	93
GA-497 HD*	7.57	9.43	10.15	**9.08**	94
Rebound 6.0	7.28	9.58	10.15	**9.00**	93
Hi-Gest 360	6.79	9.01	10.53	**8.75**	94
Persist III	5.56	7.22	9.55	**7.46**	93
RR VaMoose	5.84	7.75	8.75	**7.46**	93
Oneida VR	5.40	7.28	8.93	**7.18**	93
Vernal	5.53	7.21	8.60	**7.11**	92
GRAND MEAN	**7.38**	**9.52**	**10.09**	**9.01**	**94**
CV (%)	**9.57**	**8.26**	**8.08**	**7.64**	**1.27**
LSD (p = 0.05)	**0.99**	**1.10**	**1.14**	**0.96**	**1.66**

*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 to be a perfect stand.
- Grand Mean, CV, and LSD values represent 20 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. 2017 alfalfa variety trial—Rock Springs.

Variety	2019 Yield	2018 Yield	Two-year Average	Stand 10/28/19
55V50	7.43	9.50	**8.50**	94
SW3407*	7.72	9.20	**8.48**	94
SW 4107	7.09	9.61	**8.38**	94
SW 5210	6.96	9.43	**8.22**	93
AFX469	7.18	8.55	**7.89**	94
FSG 426	6.73	8.29	**7.56**	95
FSG 415BR	6.30	8.36	**7.34**	93
Oneida VR	5.33	7.66	**6.51**	93
Vernal	4.63	5.95	**5.23**	90
GRAND MEAN	**6.37**	**8.40**	**7.40**	**93**
CV (%)	**28.79**	**17.61**	**20.75**	**2.34**
LSD (p = 0.05)	**2.56**	**2.07**	**2.15**	**3.06**

*Not commercially available.

CV = coefficient of variation
LSD = least significant difference

- Seeded September 1, 2017.
- 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 to be a perfect stand.
- Grand Mean, CV, and LSD values represent 12 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. 2018 alfalfa variety trial—Rock Springs.

Variety	2019 Yield	Stand 10/28/19
HybriForce-4400	**7.14**	95
SW 4107	**7.14**	94
C655*	**6.99**	93
C558*	**6.85**	94
Gemstone II	**6.69**	94
Plus III	**6.61**	93
Touchstone EQ	**6.53**	94
Persist III	**6.30**	94
Hi-Gest 460	**5.84**	94
3510*	**5.69**	94
Oneida VR	**3.54**	93
Vernal	**3.03**	92
GRAND MEAN	**5.73**	**94**
CV (%)	**17.48**	**1.35**
LSD (p = 0.05)	**1.40**	**1.77**

*Not commercially available.

CV = coefficient of variation
LSD = least significant difference

- Seeded April 23, 2018.
- 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 to be a perfect stand.
- Grand Mean, CV, and LSD values represent 20 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 6. 2015 alfalfa variety trial—Landisville.

Variety	2019 Yield	2018 Yield	2017 Yield	2016 Yield	Four-year Average	Stand 10/25/19
SW 5909	6.87	8.85	11.30	10.62	**9.41**	91
SW 4113	7.14	8.51	10.95	10.75	**9.37**	88
SW 5213	6.69	8.20	11.09	10.71	**9.24**	89
FF42.A2	6.99	8.69	10.30	10.49	**9.19**	89
FSG 408DP	5.51	7.28	10.88	11.20	**8.76**	85
Plus III	6.05	7.89	10.49	10.41	**8.74**	88
FSG 426	5.94	7.54	9.84	10.80	**8.51**	87
FSG 428RR	5.49	7.47	10.39	10.62	**8.49**	85
Persist III	5.70	6.70	10.56	10.71	**8.43**	85
SW 5512Y	4.53	6.70	10.41	10.21	**7.98**	85
5312*	5.33	6.37	10.22	9.91	**7.94**	84
Oneida VR	4.41	6.67	10.17	9.94	**7.71**	81
GRAND MEAN	**5.79**	**7.46**	**10.51**	**10.49**	**8.57**	**86**
CV (%)	**14.29**	**10.91**	**9.90**	**7.10**	**7.73**	**2.65**
LSD (p = 0.05)	**1.05**	**1.14**	**1.46**	**1.04**	**0.93**	**3.18**

*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 to be a perfect stand.
- Grand Mean, CV, and LSD values represent 16 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. 2016 alfalfa variety trial—Landisville.

Variety	2019 Yield	2018 Yield	2017 Yield	Three-year Average	Stand 10/25/19
WL 365 HQ	8.78	9.40	8.94	**9.10**	93
HybriForce-4400	8.14	8.90	9.97	**9.05**	91
HybriForce-3420-Wet	7.73	9.36	9.90	**9.04**	91
Rebound 6XT	8.74	9.03	9.08	**8.97**	94
HybriForce-3430	7.53	8.00	9.32	**8.53**	90
SW 5210	7.81	8.81	8.94	**8.47**	93
KF-406 A2	7.70	8.41	9.11	**8.40**	91
HybriForce-3420/Wet-OB1*	7.65	8.65	9.05	**8.39**	91
Plus III	7.75	8.81	8.51	**8.38**	92
FF42.A2	7.81	8.56	8.51	**8.35**	90
DKA 44-16RR	7.73	8.38	8.66	**8.27**	93
LS 1302*	7.61	8.40	8.90	**8.25**	93
HybriForce-3420/Wet-OB2*	6.96	9.01	9.43	**8.22**	91
59W205*	7.44	8.31	8.47	**8.08**	93
KF-425 HD	6.68	8.64	8.88	**8.04**	92
SW 5213	7.05	8.38	8.52	**7.97**	92
GA-497 HD*	6.76	7.66	8.49	**7.68**	91
Oneida VR	5.95	8.16	8.95	**7.66**	89
Persist III	6.22	7.49	9.18	**7.62**	89
DKA 40-51RR	6.78	7.58	7.95	**7.44**	90
Vernal	5.62	6.72	7.78	**6.67**	86
GRAND MEAN	**7.25**	**8.38**	**8.82**	**8.16**	**91**
CV (%)	**16.15**	**11.86**	**12.07**	**11.04**	**1.50**
LSD (p = 0.05)	**1.64**	**1.39**	**1.49**	**1.26**	**1.91**

*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 to be a perfect stand.
- Grand Mean, CV, and LSD values represent 21 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 8. 2017 alfalfa variety trial—Landisville.

Variety	2019 Total	2018 Total	Two-year Average	Stand 10/25/19
FSG 426	8.87	9.38	**9.15**	93
HybriForce-4400	8.29	9.62	**9.01**	92
Galaxy	8.58	9.34	**8.97**	94
SW 4107	8.51	9.33	**8.87**	94
AFX469	8.35	8.77	**8.62**	95
SW3407*	8.03	9.18	**8.58**	92
55V50	7.73	9.31	**8.52**	91
SW 5210	7.60	9.28	**8.44**	94
FSG 415BR	7.97	8.74	**8.35**	91
CW 104014*	8.25	8.16	**8.20**	93
Hi-Gest 460	7.27	8.17	**7.72**	93
Oneida VR	5.56	8.03	**6.74**	90
Vernal	5.02	6.68	**5.88**	86
GRAND MEAN	**7.55**	**8.71**	**8.24**	**92**
CV (%)	**13.63**	**11.23**	**10.59**	**1.29**
LSD (p = 0.05)	**1.44**	**1.37**	**1.21**	**1.66**

*Not commercially available.

CV = coefficient of variation
LSD = least significant difference

- Seeded May 3, 2017.
- 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 to be 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. 2018 alfalfa variety trial—Landisville.

Variety	2019 Yield	Stand 10/25/19
Persist III	**7.92**	97
Touchstone EQ	**7.92**	97
SW 4107	**7.70**	97
HybriForce-4400	**7.46**	96
Plus III	**7.25**	98
Hi-Gest 460	**7.25**	96
55V50	**6.91**	95
430RRLH	**6.51**	94
Oneida VR	**6.13**	94
Vernal	**5.51**	91
GRAND MEAN	**7.17**	**95**
CV (%)	**11.10**	**0.88**
LSD (p = 0.05)	**1.11**	**1.17**

*Not commercially available.

CV = coefficient of variation
LSD = least significant difference

- Seeded April 24, 2018.
- 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 to be 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.

COOL-SEASON GRASSES

Table 10 and table 12 list cool-season grass varieties in our testing program that are currently marketed in Pennsylvania or may be available in the near future. (Please check with marketers for availability.) Tables 11 and 13 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	Marketer	Appears in Table Number
PERENNIAL RYEGRASS		
Melpetra	Hood River Seed	11
Elena	Farm Science Genetics	11
Remington	Barenbrug USA	11
BAREXTRA	Barenbrug USA	11
TetraSweet	Mountain View Seeds	11
TetraMag	Mountain View Seeds	11
Quartermaster	Chemgro Seeds	11
Premium	DLF Pickseed USA Inc.	11
Polim	DLF Pickseed USA Inc.	11
Dexter I	DLF Pickseed USA Inc.	11
Garbor	DLF Pickseed USA Inc.	11
Kentaur	DLF Pickseed USA Inc.	11
TALL FESCUE		
Otaria	Hood River Seed	11
Dominate	Seedway, LLC	11
Teton II	Mountain View Seeds	11
TIMOTHY		
Catapult	BrettYoung Seeds	11
Zenyatta	DLF Pickseed USA Inc.	11
Winnetou	DLF Pickseed USA Inc.	11
Dawn	Hood River Seed	11
Anjo	Hood River Seed	11
Climax	Public	11
MEADOW FESCUE		
Raskila	Hood River Seed	11
Pradel	Barenbrug USA	11

Continued

Table 10. *(continued)*

Species/Variety	Marketer	Appears in Table Number
ORCHARDGRASS		
Trailburst	BrettYoung Seeds	11
Alpine II	Mountain View Seeds	11
Bighorn	Mountain View Seeds	11
Devour	Mountain View Seeds	11
Aldebaran	DLF Pickseed USA Inc.	11
Invale	DLF Pickseed USA Inc.	11
Olathe	DLF Pickseed USA Inc.	11

Forage Grass Marketers Listed in This Report

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

BrettYoung Seeds
Box 99 ST. Norbert P.S.
Winnipeg, MB Canada
www.brettyoung.ca

Chemgro Seeds
East Petersburg, PA 17520
Phone: 570-847-5846
www.chemgro.com

DLF Pickseed USA Inc.
Halsey, OR 97348
Phone: 541-369-2251
www.dlfpickseed.com

Farm Science Genetics-Allied Seed
Macon, MO 63552
Phone: 660-385-6690
www.alliedseed.com/farm-science-genetics

Hood River Seed
Evansville, IN 47715
Phone: 855-406-2696
www.hoodriverseed.com

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

Seedway, LLC
Mifflinburg, PA 17844
Phone: 570-966-3841
www.seedway.com

Table 11. 2017–2019 cool-season grass variety trial—Rock Springs.

	First Cut Date*	2019 Yield	2018 Yield	Two-year Average	Stand 10/29/19	Crude Protein (%)	30-hr NDFD	TTNDFD
RYEGRASS								
TetraMag	5/21	5.27	8.03	**6.65**	95	14.19	57.89	58.44
BAR LP 16237**	5/21	4.92	8.26	**6.59**	98	13.65	61.40	60.62
BAR LP 16371**	5/21	5.55	7.50	**6.53**	90	11.49	54.32	53.94
Remington	5/30	4.70	7.89	**6.30**	97	11.69	57.55	55.67
Elena	5/21	4.94	7.46	**6.20**	94	13.91	57.30	58.45
RAD-MFP-141**	5/21	4.89	7.32	**6.10**	96	12.74	57.45	58.50
TetraSweet	5/24	4.73	7.21	**5.97**	97	12.24	56.74	56.83
BAR LP 16370**	5/21	4.91	6.92	**5.92**	89	13.19	57.61	58.56
Kentaur	5/24	5.01	6.66	**5.83**	97	11.69	60.08	59.78
BAR LP 16238**	5/21	5.62	5.97	**5.80**	98	12.72	60.26	58.81
PST-2F42X**	5/21	4.91	6.38	**5.65**	98	12.39	59.04	59.39
PST-2F44X**	5/21	4.41	6.87	**5.64**	97	12.86	58.96	59.13
Polim	5/21	4.39	6.82	**5.60**	95	14.47	61.53	62.28
Quartermaster	5/21	4.58	6.53	**5.56**	96	12.92	56.29	55.38
BAREXTRA	5/21	4.86	6.13	**5.50**	86	12.55	54.63	55.26
Garbor	5/24	4.81	6.10	**5.46**	96	11.57	57.45	57.89
Dexter I	5/21	5.11	5.73	**5.42**	98	12.91	60.32	60.10
Melpetra	5/21	4.00	6.53	**5.26**	95	14.58	61.19	61.67
DSV 17-02**	5/21	3.93	6.31	**5.12**	97	12.46	58.87	58.44
DSV 17-01**	5/24	4.24	5.75	**5.00**	97	11.69	59.15	59.96
Premium	5/21	3.39	5.44	**4.41**	97	13.84	59.59	59.18
GRAND MEAN		**4.72**	**6.75**	**5.74**	**95**	**12.84**	**58.46**	**58.49**
CV (%)		**14.99**	**5.36**	**7.62**	**2.71**			
LSD (p = 0.05)		**1.00**	**0.51**	**0.62**	**5.37**			
TALL FESCUE								
TF 0503**	5/15	5.55	8.63	**7.09**	97	14.54	58.54	56.59
Dominate	5/15	6.22	7.86	**7.04**	95	13.48	56.55	52.98
Teton II	5/15	5.65	8.36	**7.00**	96	13.28	56.75	52.54
RAD-MRF201SE**	5/15	5.91	7.78	**6.84**	97	14.49	56.88	54.04
FTF 73**	5/15	5.49	7.61	**6.55**	96	14.98	58.00	55.15
FTF 84**	5/15	4.81	7.89	**6.35**	98	14.64	58.00	55.25
FTF 70**	5/15	5.02	7.38	**6.20**	97	15.08	57.03	54.73
DSV 17-05**	5/15	4.36	7.97	**6.17**	98	14.38	57.89	55.38
PPG-FTF-112**	5/15	4.97	7.25	**6.11**	97	15.77	57.34	55.60
Otaria	5/15	4.76	7.02	**5.89**	96	16.09	57.37	55.15
GRAND MEAN		**5.27**	**7.78**	**6.52**	**96**	**14.67**	**57.44**	**54.74**
CV (%)		**9.68**	**5.73**	**5.09**	**0.79**			
LSD (p = 0.05)		**0.74**	**0.65**	**0.48**	**1.72**			
TIMOTHY								
Zenyatta	5/24	5.88	6.53	**6.21**	93	11.33	50.11	47.57
Catapult	5/24	5.65	6.58	**6.11**	93	11.90	51.62	48.94
Dawn	5/24	5.58	6.40	**5.99**	91	11.21	50.15	47.06
TM 0704 DT**	5/24	5.66	6.25	**5.96**	91	11.87	49.31	47.66

Continued

Table 11. *(continued)*

	First Cut Date*	2019 Yield	2018 Yield	Two-year Average	Stand 10/29/19	Crude Protein (%)	30-hr NDFD	TTNDFD
Anjo	5/30	5.05	5.86	**5.45**	93	10.21	49.60	45.66
TM 9902**	5/24	5.14	5.66	**5.40**	90	11.76	52.47	50.75
Winnetou	5/30	5.04	5.66	**5.35**	92	11.28	49.14	46.14
Climax	5/30	4.41	6.26	**5.34**	91	11.17	50.24	47.64
GRAND MEAN		**5.30**	**6.15**	**5.73**	**92**	**11.34**	**50.33**	**47.70**
CV (%)		**9.36**	**5.24**	**5.80**	**1.82**			
LSD (p = 0.05)		**0.73**	**0.47**	**0.49**	**ns**			
MEADOW FESCUE								
DSV 17-03**	5/21	5.33	6.71	**6.02**	95	12.21	57.81	54.94
Raskila	5/21	4.95	6.98	**5.97**	94	12.53	59.72	57.58
DSV 17-04**	5/21	4.63	6.70	**5.67**	96	12.28	55.80	55.38
BAR FP 16058**	5/21	4.38	6.53	**5.45**	97	13.31	58.97	56.67
Pradel	5/21	4.13	6.71	**5.42**	94	13.09	60.58	57.96
GRAND MEAN		**4.68**	**6.73**	**5.71**	**95**	**12.68**	**58.57**	**56.51**
CV (%)		**11.04**	**5.73**	**6.74**	**0.91**			
LSD (p = 0.05)		**0.80**	**0.59**	**0.59**	**2.40**			
ORCHARDGRASS								
Bighorn	5/15	6.26	8.18	**7.22**	95	15.47	56.77	53.25
Olathe	5/15	6.33	7.75	**7.04**	95	15.00	56.45	53.43
OG 79**	5/15	5.92	7.75	**6.83**	97	16.21	58.94	53.85
Invale	5/15	5.38	7.70	**6.54**	96	14.77	57.73	53.66
RAD-LCF46**	5/15	5.61	7.28	**6.44**	96	16.11	58.63	56.29
Trailburst	5/15	4.86	7.86	**6.36**	96	15.03	57.34	54.51
Alpine II	5/15	5.01	7.42	**6.21**	96	15.75	56.69	54.23
Devour	5/15	4.46	6.93	**5.69**	96	16.23	57.62	54.70
OG 80**	5/15	4.45	6.87	**5.66**	95	15.91	55.15	52.94
DSV 17-07**	5/15	4.59	6.37	**5.48**	93	16.53	56.87	54.63
Aldebaran	5/15	4.45	6.34	**5.39**	95	14.39	56.06	53.28
DSV 17-06**	5/15	4.04	5.65	**4.84**	95	13.64	54.25	49.95
GRAND MEAN		**5.11**	**7.17**	**6.14**	**95**	**15.42**	**56.87**	**53.73**
CV (%)		**9.33**	**4.62**	**4.51**	**1.38**			
LSD (p =).05)		**0.69**	**0.48**	**0.40**	**2.89**			
Overall								
GRAND MEAN		**4.98**	**6.94**	**5.96**	**95**			
CV (%)		**13.43**	**6.26**	**7.65**	**1.16**			
LSD (p = 0.05)		**0.93**	**0.61**	**0.64**	**1.54**			

*Date when the first cutting was made in 2019. 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 August 22, 2017.
- Yield are given in tons per acre (DM Basis).
- Overall Grand Mean, CV, and LSD values represent 58 total entries.
- Variety means are means derived from LSMeans
- Yields indicated represent the sum of four cuttings.

2018–2019 Short-Lived Cool-Season Grass Trial

In the fall 2018, a Short-Lived Cool-Season Grass Trial was seeded at Rock Springs. The trial was planted on September 15, 2018. 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 3, 2019, and was completed June 18, 2019. 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 50 units after each cutting for the multi-cut system. See the current *Penn State Agronomy Guide* for specific recommendations about establishment, fertilization, and other management considerations.

Table 12. Short-lived forage varieties marketed in Pennsylvania and listed in this report.

Species/Variety	Marketer	Appears in Table No.
ANNUAL RYEGRASS		
Ranahan	Mountain View Seeds	13
Centurion	Mountain View Seeds	13, 14
Andes	DLF Pickseed USA	13
New Dawn	DLF Pickseed USA	13
Kodiak	DLF Pickseed USA	13
McKinley	DLF Pickseed USA	13
Ribeye	Barenbrug USA	13
Barextra	Barenbrug USA	13
Marshall	The Wax Co., LLC	13, 14
Jackson	The Wax Co., LLC	13, 14
Nelson	The Wax Co., LLC	13, 14
TIMOTHY		
Carson	Mountain View Seeds	15
Barpenta	Barenbrug USA	15
Barfleo	Barenbrug USA	15
Zenyatta	DLF Pickseed USA	15
Climax	Public	15
TRITICALE		
MBX Tri-Cow 814	Eddie Mercer Agri-Services	16
TriCal Gainer 154	TriCal Superior Forage	16
SY TF813	TriCal Superior Forage	16
HyOctane	Seedway LLC	16
TriCal 336	Seedway LLC	16
RYE		
KWS Propower	KWS Cereals USA LLC	16
KWS Progas	KWS Cereals USA LLC	16
Bariello	KWS Cereals USA LLC	16
Brasetto	KWS Cereals USA LLC	16
Aroostook	Public	16
MIX		
King's Soil Builder Plus	King's Agriseeds Inc.	17

Forage Grass Marketers Listed in This Report

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

DLF Pickseed USA Inc.
Halsey, OR 97348
Phone: 541-369-2251
www.dlfpickseed.com

Eddie Mercer Agri-Services
Frederick, MD 21701
Phone: 410-409-7538
www.eddiemerceragri-services.com

King's Agriseeds
Ronks, PA 17572
Phone: 717-687-6224
www.kingsagriseeds.com

KWS Cereals USA
Champaign, IL 61822
Phone: 303-489-4265
www.kws.com

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

Seedway LLC
Mifflinburg, PA 17844
Phone: 570-966-3841
www.seedway.com

TriCal Superior Forage
Union, KY 41091
Phone: 859-802-2288
www.tricalforage.com

The Wax Company, LLC
Amory, MS 38821
Phone: 662-256-3511
www.mercolocal.com

Table 13. Annual ryegrass—multiple cut.

		DM Yield (tons per acre)				First Cut Analysis		
Variety	**Harvest Date**	**Cut 1**	**Cut 2**	**Cut 3**	**Total**	**CP (%)**	**30-hr NDFD**	**TTNDFD**
New Dawn	5/7, 5/29, 6/18	3.77	1.69	1.05	**6.51**	17.3	62.7	62
Andes	5/7, 5/29, 6/18	3.97	1.46	1.05	**6.48**	18.6	63.7	61
Centurion	5/7, 5/29, 6/18	3.41	1.31	0.96	**5.68**	18.1	60.4	58
Kodiak	5/7, 5/29, 6/18	3.13	1.31	0.98	**5.42**	19.3	62.6	63
Marshall	5/7, 5/29, 6/18	3.16	1.33	0.88	**5.37**	18.5	65.2	65
Ribeye	5/7, 5/29, 6/18	3.26	1.39	0.67	**5.32**	20.0	62.9	61
Barextra	5/7, 5/29, 6/18	2.72	1.43	1.16	**5.31**	20.0	64.8	65
McKinley	5/7, 5/29, 6/18	3.07	1.27	0.97	**5.31**	18.9	62.2	61
Ranahan	5/7, 5/29, 6/18	2.70	1.50	1.05	**5.25**	18.0	60.1	59
Nelson	5/7, 5/29, 6/18	2.93	1.35	0.92	**5.20**	21.1	66.6	66
Jackson	5/7, 5/29, 6/18	2.71	1.35	0.93	**4.99**	20.9	65.6	65
Grand Mean	**3.18**	**1.40**	**1.00**	**5.57**	**19.3**	**64.0**	**63.3**	
CV (%)		**0.59**	**0.28**	**0.25**	**0.69**			
LSD (p = 0.05)	**13.20**	**14.04**	**17.72**	**8.74**				

CV = coefficient of variation
LSD = least significant difference

- Yields are given in tons per acre (DM basis).
- Grand Mean, CV, and LSD values represent 22 total entries.
- Means are LSMeans derived from statistical analysis.
- Rankings are based on total yields.

Table 14. Annual ryegrass—single cut.

Variety	**Harvest Date**	**DM Yield (tons per acre)**	Quality Analysis		
			CP (%)	**30-hr NDFD**	**TTNDFD**
Centurion	5/9	**3.01**	16.7	57.9	55.4
Jackson	5/9	**2.84**	20.2	62.5	63.1
Nelson	5/9	**2.78**	18.0	58.9	58.7
Marshall	5/9	**2.55**	20.9	63.3	63.4
Mean		**2.80**	**19.0**	**60.6**	**60.1**
CV (%)		**0.26**			
LSD (p = 0.05)		**5.74**			

CV = coefficient of variation
LSD = least significant difference

- Yields are given in tons per acre (DM basis).
- Grand Mean, CV, and LSD values represent 4 total entries.
- Means are LSMeans derived from statistical analysis.
- Rankings are based on total yields.

Table 15. Timothy—single cut.

Variety	Harvest Date	DM Yield (tons per acre)	Quality Analysis		
			CP (%)	30-hr NDFD	TTNDFD
Barfleo	6/3	**3.08**	12.9	50.8	46.6
Carson	5/25	**2.98**	14.0	50.7	47.4
Zenyatta	5/25	**2.84**	18.1	62.0	59.9
Climax	6/3	**2.52**	17.5	58.1	56.1
Barpenta	6/3	**2.22**	15.4	51.5	49.0
Mean		**2.72**	**15.6**	**54.6**	**51.8**
CV (%)		**0.93**			
LSD (p = 0.05)		**22.21**			

CV = coefficient of variation
LSD = least significant difference

- Yields are given in tons per acre (DM basis).
- Grand Mean, CV, and LSD values represent 5 total entries.
- Means are LSMeans derived from statistical analysis.
- Rankings are based on total yields.

Table 16. Short-season cereals—single cut.

Variety	Harvest Date	DM Yield (tons per acre)	Quality Analysis		
			CP (%)	30-hr NDFD	TTNDFD
HyOctane	5/9	**2.85**	19.0	59.8	59.4
Aroostook	5/3	**2.83**	19.1	60.9	59.1
Brasetto	5/6	**2.71**	19.5	61.1	57.6
Bariello	5/6	**2.62**	19.8	61.9	60.0
MBX Tri-Cow 814	5/9	**2.53**	20.6	66.6	63.9
KWS Propower	5/6	**2.48**	18.9	65.1	63.2
TriCal 336	5/9	**2.46**	19.0	62.3	62.5
TriCal Gainer 154	5/9	**2.45**	19.5	60.3	59.7
KWS Progas	5/3	**2.06**	19.8	65.1	65
SY TF813	5/9	**1.90**	20.6	65.4	65
Mean		**2.49**	**19.8**	**63.0**	**61.9**
CV (%)		**0.47**			
LSD (p = 0.05)		**13.41**			

CV = coefficient of variation
LSD = least significant difference

- Yields are given in tons per acre (DM basis).
- Grand Mean, CV, and LSD values represent 19 total entries.
- Means are LSMeans derived from statistical analysis.
- Rankings are based on total yields.

Table 17. Forage mix—single cut.

Variety	Harvest Date	DM Yield (tons per acre)	Quality Analysis		
			CP (%)	30-hr NDFD	TTNDFD
King's Soil Builder Plus (triticale, crimson clover, hairy vetch, annual ryegrass, Daikon radish)	5/9	**2.67**	17.5	58.1	56.1
Grand Mean		**2.80**			

Yields are given in tons per acre (DM basis).

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