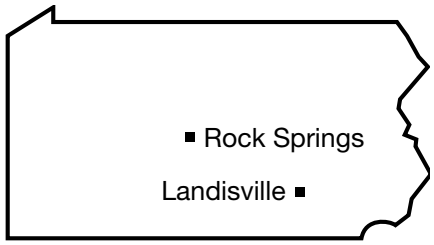
2014 FORAGE TRIALS REPORT

SUMMARY

The *2014 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.



Summary of Forage Growing Conditions and Insect Pressure in 2014

The combination of a wet and cool spring delayed first harvests across the state. Continued wet weather produced great second harvest yields but again made it difficult to harvest on time. Then in August, some areas in the southeast saw dry weather and reduced yields while most of the state continued to receive excessive moisture. The number and quality of samples entered in the 2014 Pennsylvania Forage and Grassland Council's Hay Show at Ag Progress Days were up slightly from 2013 but still low relative to normal. Low numbers are a reflection of this year's generally poor hay-making conditions.

Alfalfa weevil populations were generally low with few localized outbreaks. Potato leafhopper infestations were average across most of the state. The dry weather in some areas caused leafhopper damage to be more pronounced than in a "normal" year. Cereal leaf mite damage to timothy and grubs damage to orchardgrass continue to be problems.

Growing-season precipitation amounts for the past three years at Rock Springs and Landisville are presented in Figures 1 through 6 (page 2) by monthly total. Normal amounts are also presented.

Criteria for Reporting Varieties

All varieties listed in this report are eligible for certification by seed certifying agencies and marketed in Pennsylvania (see Tables 1 and 10). 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 12. Only varieties currently being marketed in Pennsylvania appear in the tables. Although the trials contain up to 37 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 this crop year. 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 as well as 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 ground cover, which is given 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/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. 2014 Precipitation at Rock Springs

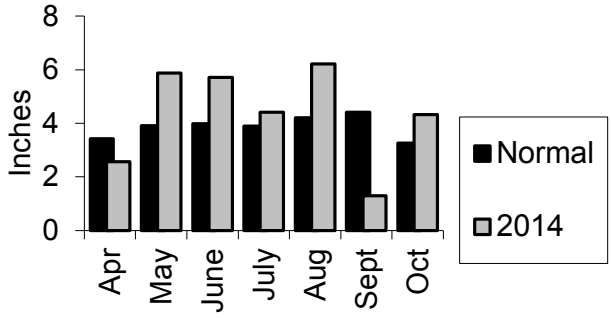


Figure 2. 2014 Precipitation at Landisville

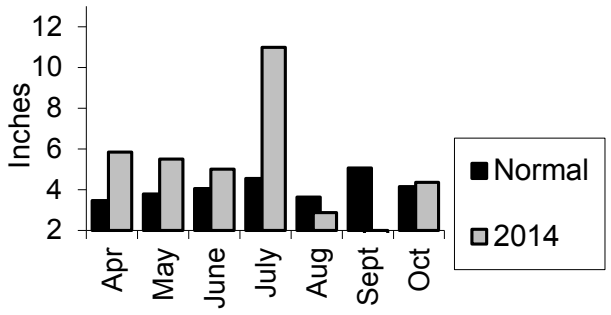


Figure 3. 2013 Precipitation at Rock Springs

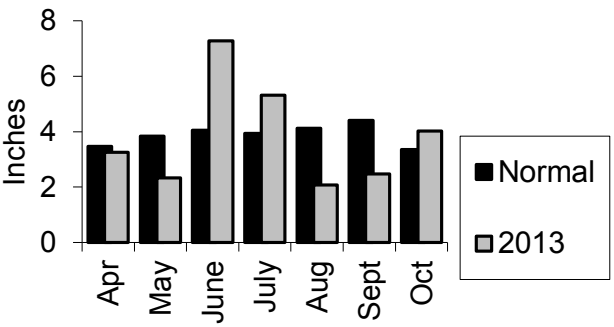


Figure 4. 2013 Precipitation at Landisville

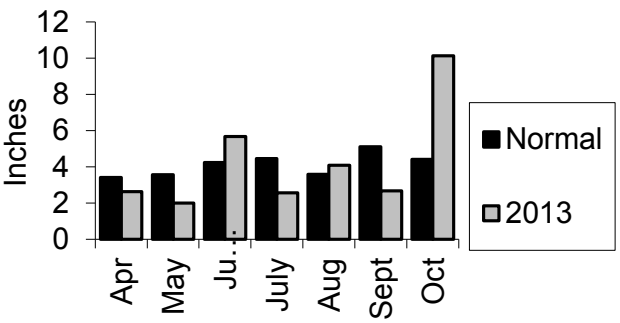


Figure 5. 2012 Precipitation at Rock Springs

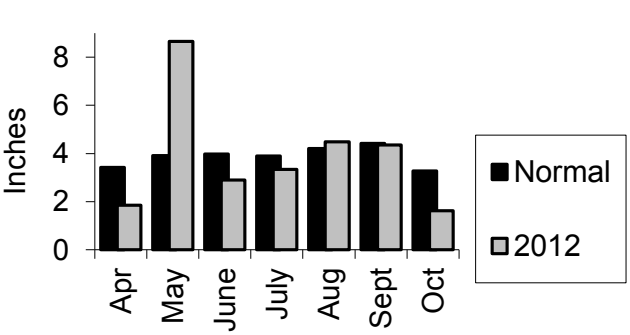
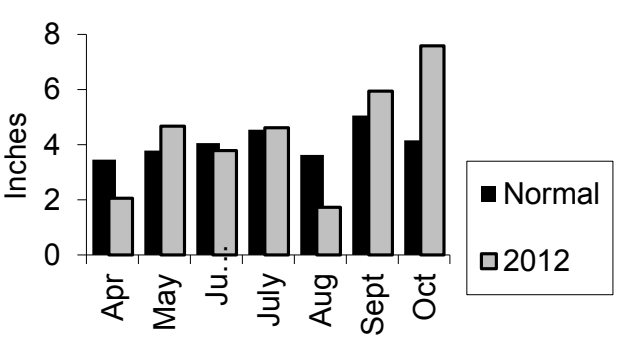


Figure 6. 2012 Precipitation at Landisville



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 usually have 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 probably are adapted to a wider range of environmental conditions.
3. Performance data over several years can be very useful in selecting a variety because 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 less, 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, as well as 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.

The tables in this report may be reproduced only in their entirety.

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.

			Pest Resistance Ratings						
Variety	Marketer	Fall Dormancy	BW	VW	FW	AN	PRR	APH1	Appears in Table No.
54QR04	Pioneer Hi-Bred	4	HR	HR	HR	HR	HR	HR	5,9
55H94	Pioneer Hi-Bred	5	HR	HR	HR	HR	HR	HR	5,9
55Q27	Pioneer Hi-Bred	5	HR	HR	HR	HR	HR	HR	5,9
55V50	Pioneer Hi-Bred	5	HR	HR	R	HR	HR	HR	5,9
6417	Garst/Syngenta	4	HR	HR	HR	HR	HR	HR	2,6
6585Q	NEXGROW	5	HR	HR	HR	HR	HR	HR	5
428RR	Seedway	4	HR	HR	HR	HR	HR	HR	5,9
4030	Preferred Seeds	4	HR	HR	HR	HR	HR	HR	2,6
4A415	Mycogen	4	HR	HR	HR	HR	HR	HR	2,6
4S417	Mycogen	4	HR	HR	HR	HR	HR	HR	2,6
6305Q	Garst/Syngenta	3	HR	HR	HR	HR	HR	HR	2,6
AmeriStand 407TQ	P.L. Rohrer	4	HR	HR	HR	HR	HR	HR	3,7
Archer III	P.L. Rohrer	5	HR	HR	HR	HR	HR	HR	3,7
Crave	T.A. Seeds	4	HR	HR	HR	HR	HR	HR	3,4,8
DG 4210	Crop Production Services	4	HR	HR	HR	HR	HR	HR	2,3,5,6,9
DKA 34-17 RR	Dekalb	4	HR	HR	HR	HR	HR	HR	3,4,7,8
DKA 41-18 RR	Dekalb	4	HR	HR	HR	HR	HR	HR	3,5,7,8,9
EZRA	Seedway	3	R	R	HR	HR	HR	HR	2,6
FSG 329	Seedway	4	HR	HR	HR	HR	HR	HR	7
FSG 403 LR	Seedway	4	HR	HR	R	HR	HR	HR	5,9
FSG 408 DP	Seedway	4	HR	R	HR	HR	HR	HR	5,9
FSG 505	Seedway	5	HR	HR	HR	HR	HR	HR	8
FSG 524	Seedway	5	HR	HR	HR	HR	HR	HR	5,9
Gemstone	Chemgro	4	HR	HR	HR	HR	HR	HR	4,8
Gunner	Cropland	5	HR	HR	HR	HR	HR	HR	3,7
Hybri+Jade	Channel	4	HR	HR	HR	HR	HR	HR	3,7
HYBRIFORCE-2400	Dairyland Seed Co.	4	HR	HR	HR	HR	HR	HR	2,6
HYBRIFORCE-2420	Dairyland Seed Co.	4	HR	HR	HR	HR	HR	HR	2,6

(Table 1. continued)

Variety	Marketer	Fall Dormancy	Pest Resistance Ratings						Appears in Table No.
			BW	VW	FW	AN	PRR	APH1	
HybriForce-3400	Dairyland Seed Co.	4	HR	HR	HR	HR	HR	HR	7,8
Hybriforce-3400 QR	Dairyland Seed Co.	4	HR	HR	HR	HR	HR	HR	8
L 455HD	Legacy Seeds	4	HR	HR	HR	HR	HR	HR	5
Magnitude	FS Seed	4	HR	HR	HR	HR	HR	HR	4,5
Magnum 7	Dairyland Seed Co.	4	HR	HR	HR	HR	HR	HR	4
MAGNUM 7- WET	Dairyland Seed Co.	4	HR	HR	HR	HR	HR	HR	2,4
Mariner IV	FS Seed	4	HR	HR	HR	HR	HR	HR	2,4,5
MILESTONE II	Chemgro	4	HR	HR	HR	HR	HR	HR	2,6
N-R-GEE	Seedway	4	HR	HR	HR	R	R	-	3,7
ONEIDA VR	Public	3	R	HR	HR	MR	MR	-	2,3,4,6,7,8
Persist II	Doebler's	4	HR	HR	HR	HR	HR	HR	2,3,4,7,8
PHIRST EXTRA	Doebler's	4	HR	HR	HR	HR	HR	HR	2,6
PILLAR	Doebler's	4	HR	HR	HR	HR	HR	HR	2,6
PLUSS II	Doebler's	4	HR	HR	HR	HR	HR	HR	2,3,6,7
Profilic II	Doebler's	4	HR	HR	HR	HR	HR	HR	3,7
PROFUSION-HX	King's AgriSeed	4	HR	HR	HR	HR	HR	HR	6
RED FALCON BR	Blue River Hybrids	4	HR	HR	HR	HR	HR	HR	2
ReNew	FS Seed	4	HR	HR	HR	HR	HR	HR	3
Secure-BR	King's AgriSeed	4	HR	HR	HR	HR	HR	HR	3
Seneca	R. M. Seed	4	HR	HR	HR	HR	HR	HR	2,3,7
SHOCKWAVE BR	Brett Young Seeds	4	HR	HR	HR	HR	HR	HR	2,3,4
STOCKPILE	Dairyland Seed Co.	4	HR	HR	HR	HR	HR	HR	2
VERNAL	Public	4	R	S	MR	S	S	S	2,3,4,6,7,8
WL 343 HQ	WL Alfalfas	4	HR	HR	HR	HR	HR	HR	2,7
WL 354 HQ	WL Alfalfas	4	HR	HR	HR	HR	HR	HR	7
WL 363 HQ	WL Alfalfas	4	HR	HR	HR	HR	HR	HR	2,6

Alfalfa Marketers Listed in this Report (Location, Phone Number, and Website)

AgVenture, Inc.
Kentland, IN 47951
Phone: 888-999-0859
Web: www.agventure.com

Allied Seed, LLC
Macon, MO 63552
Phone: 800-880-8127
Web: www.alliedseed.com

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

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

Channel Seed
St. Louis, MO 63167
Phone: 314-694-1000
Web:www.channel.com

Crop Production Services
Holtwood, PA 17532
Phone: 707-284-5350
Web: www.cropproductionservices.com

Dairyland Seed Company
West Bend, WI
Phone: 800-236-0163
Web: www.dairylandseed.com

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

Doebler's
Jersey Shore, PA 17740
Phone: 570-753-3210
Web: www.doeblers.com

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

Hytest Seeds
Dover, PA 17315
Phone: 717-870-0351

King's AgriSeeds
Ronks, PA 17572
Phone: 866-687-6224
Web: Kingsagriseeds.com

Mid-Atlantic Seeds
York, PA 17403
Phone: 717-852-8894

Mycogen Seeds
Export, PA 15632
Phone: 724-468-6533
Web: www.dowagro.com/mycogen

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

NuTech Seed
Ames, IA 50010
Phone: 5152321997
Web: www.nutechseed.com

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

P. L. Rohrer & Bro., Inc.
Smoketown, PA 17576
Phone: 717-299-2571
Web: www.rohrerseeds.com

Preferred Seed Company
Buffalo, NY 14227
Phone: 716-895-7333
Web: preferredseed.com

Producer's Choice
Jordan, MN 55352
Phone: 877-560-5181
Web: www.producerschoiceseed.com

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

Syngenta Seeds
Minnetonka, MN 55305
Phone: 800-445-0956
Web: www.syngentaseeds.com

T.A. Seeds
Jersey Shore, PA 17740
Phone: 570-753-5503
Web: www.taseeds.com

Winfield Solutions
Dover, PA
Phone: 717-870-0351

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Table 2. 2010 alfalfa trial—Rock Springs.

Variety	2014 Yield	2013 Yield	2012 Yield	2011 Yield	Four-year Average	Stand 9/19/14
PLUSS II	8.90	7.56	7.44	6.68	**7.64**	83
STOCKPILE*	8.56	7.02	7.70	7.04	**7.59**	81
FG 47M417	8.25	7.21	7.75	6.77	**7.46**	82
6305Q	8.29	7.00	8.03	6.41	**7.43**	83
DG 4210	8.70	7.09	7.38	6.51	**7.40**	85
PERSIST III*	7.72	6.86	7.55	7.23	**7.35**	83
4030*	7.93	6.82	7.66	6.87	**7.34**	82
SENECA*	7.25	6.74	7.96	7.36	**7.32**	80
MAGNUM 7- WET	7.40	6.82	8.06	7.02	**7.31**	79
PILLAR	8.53	7.14	7.15	6.44	**7.31**	83
WL 363 HQ	7.86	6.70	7.74	6.35	**7.18**	84
MILESTONE II	7.47	6.76	7.77	6.68	**7.18**	82
HYBRIFORCE-2420	7.20	6.58	7.57	6.81	**7.05**	78
Mariner IV	7.70	6.65	7.29	6.46	**7.04**	82
WL 343 HQ	7.88	6.72	7.53	6.09	**7.03**	85
SHOCKWAVE BR	6.81	6.43	7.96	6.74	**6.99**	78
6417	8.03	6.61	7.06	6.37	**6.97**	84
LS 504	7.44	6.38	7.54	6.56	**6.96**	81
HYBRIFORCE-2400	7.01	6.49	7.29	6.58	**6.88**	81
4S417	7.07	6.42	7.26	6.43	**6.79**	83
4A415	7.06	6.26	7.19	6.35	**6.74**	80
RED FALCON BR	6.92	6.18	7.23	6.52	**6.71**	80
PHIRST EXTRA	7.19	6.15	7.04	6.28	**6.68**	80
EZRA	6.44	6.17	7.09	6.36	**6.53**	78
NY0946	6.08	5.59	6.78	6.01	**6.12**	78
NY0947	5.99	5.39	6.91	5.97	**6.09**	81
5312	5.65	5.42	6.88	5.86	**5.95**	77
ONEIDA VR	5.59	5.46	6.42	5.66	**5.78**	78
VERNAL	4.73	4.43	5.63	5.39	**5.03**	64
GRAND MEAN	7.35	6.48	7.37	6.50	**6.93**	81
CV (%)	9.48	6.53	6.34	8.50	**5.64**	3.99
LSD (p = 0.05)	0.86	0.59	0.65	0.77	**0.55**	4.51

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

CV = coefficient of variation
LSD = least significant difference

- Seeded April 22, 2010.
- Yields (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 32 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.

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Table 3. 2011 alfalfa variety trial—Rock Springs.

Variety	2014 Yield	2013 Yield	2012 Yield	Three-year Average	Stand 9/19/14
Crave*	8.26	7.06	7.28	**7.52**	83
Secure-BR*	7.47	6.97	7.01	**7.15**	84
Persist III*	7.33	6.76	7.28	**7.14**	84
DG 4210	7.59	6.76	6.21	**6.84**	85
Seneca*	6.87	6.58	7.04	**6.83**	83
Profilic II*	7.16	6.51	6.80	**6.82**	84
Hybri+Jade*	6.91	6.47	6.44	**6.60**	83
LS 803	6.87	6.38	6.54	**6.59**	83
Pluss II*	7.21	6.26	6.20	**6.57**	86
Shockwave-BR*	6.94	6.46	6.33	**6.57**	85
ReNew*	6.87	6.55	6.18	**6.52**	83
Gunner	7.03	5.96	6.26	**6.44**	85
Archer III	6.90	6.28	6.23	**6.42**	83
AmeriStand 407TQ	6.63	6.16	6.11	**6.31**	84
Persist II	6.52	6.02	6.22	**6.26**	83
DKA 34-17 RR	6.51	6.02	6.16	**6.25**	84
DKA 41-18 RR	6.61	6.09	5.87	**6.20**	84
5312	5.72	5.69	6.34	**5.89**	84
Oneida VR	5.59	5.59	5.99	**5.74**	83
N-R-GEE	5.32	5.35	5.63	**5.42**	83
Vernal	4.79	4.87	5.33	**5.00**	82
GRAND MEAN	7.72	6.25	6.42	**6.72**	85
CV (%)	17.21	18.09	15.85	**16.80**	2.48
LSD (p = 0.05)	1.86	1.58	1.42	**1.58**	2.95

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

CV = coefficient of variation
LSD = least significant difference

- Seeded May 7, 2011.
- Yields (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 36 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.

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Table 4. 2012 alfalfa variety trial—Rock Springs.

Variety	2014 Yield	2013 Yield	Two-year Average	Stand 9/19/14
Persist III*	9.50	7.54	**8.51**	85
Gemstone*	9.75	7.05	**8.47**	85
Magnitude*	8.91	6.90	**7.94**	84
Magnum 7*	8.54	6.93	**7.72**	84
Crave*	8.22	7.16	**7.67**	84
Mariner IV	8.17	6.85	**7.55**	84
F 2 DKA 41-18 RR	8.31	6.71	**7.48**	83
Magnum 7-wet	8.41	6.26	**7.32**	84
Shockwave-BR	7.89	6.54	**7.22**	84
DKA 34-17 RR	7.69	6.21	**6.96**	84
Legacy 449 Aph 2	7.48	6.35	**6.92**	84
5312	6.87	5.79	**6.31**	83
Oneida VR	6.50	5.53	**6.01**	82
Vernal	6.62	5.22	**5.92**	83
GRAND MEAN	8.18	6.64	**7.42**	84
CV (%)	8.17	7.76	**14.06**	1.78
LSD (p = 0.05)	0.93	0.72	**1.46**	2.10

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

CV = coefficient of variation
LSD = least significant difference

- Seeded April 5, 2012.
- Yields (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.

The tables in this report may be reproduced only in their entirety.

Table 5. 2013 alfalfa variety trial—Rock Springs.

Variety	2014 Yield	Stand 9/19/14
55V50	**9.33**	87
FSG 524	**9.15**	88
55Q27	**9.11**	87
428RR	**8.90**	91
6585Q	**8.86**	90
FSG 408DP	**8.73**	84
DG 4210	**8.58**	91
FSG 403LR	**8.38**	84
54QR04	**8.17**	87
55H94	**8.10**	82
DKA 41-18 RR	**8.09**	86
L 455 HD	**7.95**	87
5454	**7.74**	83
FSG 424	**7.72**	86
5312	**7.54**	82
Vernal	**7.20**	76
Oneida VR	**6.29**	74
GRAND MEAN	**8.24**	85
CV (%)	**13.41**	0.33
LSD (p = 0.05)	**1.55**	0.39

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

CV = coefficient of variation
LSD = least significant difference

- Seeded April 11, 2013.
- Yields (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 32 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 6. 2010 alfalfa variety trial—Landisville.

Variety	2014 Yield	2013 Yield	2012 Yield	2011 Yield	Four-year Average	Stand 10/23/14
4030*	9.14	6.92	8.56	10.24	**8.73**	80
DG 4210*	8.79	6.90	7.89	9.64	**8.39**	75
MILESTONE II	8.85	6.74	7.34	9.93	**8.33**	78
WL 363 HQ	8.00	6.75	7.89	9.96	**8.21**	75
PILLAR	8.86	6.21	7.30	9.62	**8.09**	76
PLUSS II	8.53	6.35	6.91	9.12	**7.80**	81
5312	8.14	5.94	7.22	9.76	**7.78**	76
PROFUSION-HX	7.96	6.50	7.45	8.95	**7.77**	80
PHIRST EXTRA	8.17	6.00	7.54	9.37	**7.77**	79
HYBRIFORCE-2400	7.85	6.47	7.41	9.23	**7.76**	79
WL 343 HQ	8.94	6.28	7.12	8.71	**7.74**	77
EZRA	7.66	5.81	7.23	9.32	**7.51**	82
6305Q	8.80	6.19	6.66	8.41	**7.50**	75
HYBRIFORCE-2420	8.09	6.37	6.86	8.29	**7.43**	79
6417	8.18	6.25	6.84	8.30	**7.40**	74
NY0947	7.56	5.83	6.92	8.90	**7.27**	79
4A415	8.17	5.72	6.69	8.14	**7.19**	79
4S417	6.90	5.91	6.75	8.78	**7.09**	83
ONEIDA VR	7.60	5.22	6.13	8.38	**6.78**	78
VERNAL	7.02	4.55	5.38	7.99	**6.20**	66
GRAND MEAN	8.23	6.10	7.14	9.06	**7.64**	77
CV (%)	13.07	38.04	13.32	11.93	**10.41**	4.43
LSD (p = 0.05)	1.51	0.25	1.33	1.51	**1.11**	4.80

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

CV = coefficient of variation
LSD = least significant difference

- Seeded April 20, 2010.
- Yields (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 32 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. 2011 alfalfa variety trial—Landisville.

Variety	2014 Total	2013 Total	2012 Total	Three-year Average	Stand 10/23/14
HybriForce-3400*	9.38	7.77	8.39	**8.51**	79
Seneca*	9.19	7.58	8.49	**8.38**	79
Archer III*	9.00	7.62	7.94	**8.19**	82
WL 354 HQ	9.54	7.70	7.33	**8.18**	79
FSG 329*	8.66	7.55	8.40	**8.15**	78
Pluss II*	9.54	7.14	7.35	**8.00**	79
AmeriStand 407TQ*	8.71	7.42	7.36	**7.79**	80
Hybri+Jade*	8.74	7.05	7.58	**7.79**	80
Profilic II*	8.54	6.68	8.15	**7.78**	77
Gunner*	8.47	6.66	8.11	**7.74**	80
DKA 34-17 RR	8.72	6.72	7.50	**7.65**	77
Persist II	8.51	6.78	7.44	**7.58**	77
DKA 41-18 RR	8.28	6.53	7.27	**7.35**	77
Vernal	8.13	6.15	7.45	**7.25**	68
N-R-GEE	7.40	6.22	7.13	**6.91**	74
Oneida VR	7.23	6.08	6.79	**6.71**	77
GRAND MEAN	8.70	6.97	7.76	**7.80**	78
CV (%)	13.79	15.11	13.21	**13.06**	6.63
LSD (p = 0.05)	1.68	1.48	1.44	**1.43**	7.24

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

CV = coefficient of variation
LSD = least significant difference

- Seeded May 10, 2011.
- Yields (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 8. 2012 alfalfa variety trial—Landisville.

Variety	2014 Yield	2013 Yield	Two-Year Average	Stand 10/23/14
Persist III*	9.17	6.91	**8.11**	77
Stockpile*	8.68	7.14	**7.96**	80
Hybriforce-3400 QR	8.75	6.88	**7.82**	76
Hybriforce-3400*	8.31	7.02	**7.67**	72
Crave*	8.39	6.77	**7.62**	78
Gemstone*	8.47	6.51	**7.56**	76
Legacy 449 Aph 2	8.02	6.45	**7.27**	72
5312	8.15	6.00	**7.11**	64
DKA 41-18 RR	7.86	6.01	**6.94**	77
DKA 34-17 RR	8.14	5.57	**6.89**	70
FSG 505	7.60	5.71	**6.68**	74
Vernal	7.84	5.12	**6.55**	60
Oneida VR	7.17	5.32	**6.27**	67
GRAND MEAN	8.20	6.30	**7.28**	73
CV (%)	9.01	17.25	**10.81**	18.10
LSD (p = 0.05)	1.04	1.52	**1.10**	18.39

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

CV = coefficient of variation
LSD = least significant difference

- Seeded April5, 2012.
- Yields (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 24 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.

The tables in this report may be reproduced only in their entirety.

Table 9. 2013 alfalfa variety trial—Landisville.

Variety	2014 Total	Stand 10/23/14
FSG 403LR	**8.84**	87
55Q27	**8.83**	88
FSG 524	**8.37**	91
FSG 424	**8.36**	86
55V50	**8.36**	88
Mariner IV	**8.18**	86
FSG 408DP	**8.05**	88
L 455 HD	**7.97**	87
428RR	**7.78**	87
5312	**7.78**	87
DKA 41-18 RR	**7.74**	86
5454	**7.72**	86
54QR04	**7.65**	88
DG 4210	**7.49**	87
55H94	**7.36**	86
Magnitude	**7.32**	85
Oneida VR	**7.10**	88
Vernal	**6.72**	84
GRAND MEAN	**9.20**	87
CV (%)	**9.71**	2.31
LSD (p = 0.05)	**1.25**	2.82

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

CV = coefficient of variation
LSD = least significant difference

- Seeded April5, 2013.
- Yields (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 10. Cool-season grass varieties marketed in Pennsylvania and listed in this report.

Species/ Variety	Ploidy/ Species	Marketer	Appears in Table No.
Bromegrass			
AC Success	Hybrid Brome	Allied Seed, LLC	12
Peak	Brome, Smooth	Allied Seed, LLC	12
York	Brome, Smooth	Ampac Seed Company	12
Fescue			
Flourish	Fescue, Tall	Seedway	11, 12
Jesup MaxQ	Fescue, Tall	Pennington	12
Kentucky 31	Fescue, Tall	Public	11, 12
Texoma MaxQ II	Fescue, Tall	Pennington	12
Festulolium			
Bonus	Festulolium	Growmark FS	12
Fojtan	Festulolium	DLF International Seeds	12
Gain	Festulolium	Seedway	12
Orchardgrass			
Bounty		Seedway	12
Endurance	Dactylis	DLF International Seeds	12
Extend		Seedway	12
Haymaster		Seedway	12
Invale	Dactylis	DLF International Seeds	12
Olathe	Dactylis	DLF International Seeds	12
Pawnee		Seedway	12
Pennlate		P.L. Rohrer	11, 12
Potomac		P.L. Rohrer	11
Tucker		Oregro Seed Inc.	11
Ryegrass			
Albion	Tetraploid Perennial	Grassland Oregon, Inc.	12
Boost	Tetraploid Perennial	Seedway	12
Calibra	Tetraploid Perennial	DLF International Seeds	11
Elena DS	Tetraploid Perennial	Allied Seed	11
Linn	Diploid Perennial	Public	11
Quartermaster			11
Verseka			11
Timothy			
Climax		Allied Seed, LLC	12
Crest		Seedway	12
Derby		Growmark FS	12
Summit		Seedway	12
Tuuka		P.L. Rohrer	11

Forage Grass Marketers Listed in this Report (Location, Phone Number, and Website)

Allied Seed, LLC
Macon, MO 63552
Phone: 800-880-8127
Web: www.alliedseed.com

DLF International Seeds
Halsey, OR 97348
Phone: 800-445-2251
Web: www.intlseed.com

Grassland Oregon
Salem, OR 97305
Phone: 503-566-9900
Web: www.grasslandoregon.com

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

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

Oregro Seeds Inc.
Albany, OR 97322
Phone: 541-258-1001
Web: www.oregroseeds.com

Pennington Seed
Madison, GA 30650
Phone: 800-285-7333
Web: www.penningtonseed.com

P. L. Rohrer & Bro., Inc.
Smoketown, PA 17576
Phone: 717-299-2571
Web: www.rohrerseeds.com

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

COOL-SEASON GRASSES

Table 10 lists cool-season perennial grass varieties in our testing program that are currently marketed in Pennsylvania.

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 11. 2012 cool-season grass variety trial—Rock Springs

Variety	First Cut Date*	2014 Yield	2013 Yield	Two-year Total	Stand 10/28/14	30-hr NDFD
Orchardgrass						
Excellate SA	23-May	7.81	6.70	14.51	77	78
Potomac	19-May	8.53	5.60	14.23	81	79
GRAND MEAN		8.17	6.15	14.32	79	
CV (%)		7.74	12.61	5.40	6.75	
LSD (p = 0.05)		ns	1.75	ns	ns	
Ryegrass						
Linn	23-May	5.37	4.22	9.59	84	78
Elena DS	28-May	5.04	3.05	8.09	75	78
Calibra	28-May	4.86	3.08	7.94	75	80
Quartermaster	28-May	4.57	3.03	7.60	68	75
Verseeka	28-May	4.68	2.48	7.16	79	77
GRAND MEAN		4.90	3.17	8.08	76	
CV (%)		13.39	16.61	8.93	5.08	
LSD (p = 0.05)		ns	0.81	1.11	5.98	
Tall Fescue						
Kentucky 31 E-	19-May	10.33	8.22	18.56	83	76
Kentucky 31 E+	19-May	9.30	8.35	17.65	82	75
Flourish	23-May	7.06	7.65	14.71	86	76
GRAND MEAN		8.90	8.07	16.97	84	
CV (%)		11.52	6.38	4.84	4.72	
LSD (p = 0.05)		1.77	0.89	1.42	ns	

*Refers to the date when the first cutting was made in 2013. First cutting was made at late boot to early heading.

CV = coefficient of variation
LSD = least significant difference

- Seeded April 13, 2012.
- Yields (tons per acre DM Basis).
- Grand Mean, CV, and LSD values represent 10 total entries.
- Variety means are means derived from LSMeans.
- Yields indicated represent the sum of four cuttings.

Table 12. 2013 Cool-season grass variety trial—Rock Springs.

Variety	First Cut Date*	2014 Total	Stand 10/27/14	30-hr NDFD
Brome				
York	23-May	6.90	78	70
Peak	23-May	6.55	79	70
AC Success	23-May	6.31	82	81
GRAND MEAN		6.59	79	
CV (%)		7.52	4.16	
LSD (p = 0.05)		ns	ns	
Festulolium				
Fojtan	23-May	8.11	91	68
Bonus	28-May	6.26	83	68
Gain	28-May	5.30	6	75
GRAND MEAN		6.56	60	
CV (%)		11.85	5.83	
LSD (p =0.05)		1.35	6.07	
Orchardgrass				
Endurance	19-May	8.77	91	74
Haymaster	19-May	8.68	91	73
Bounty	19-May	8.65	93	70
Inavale	19-May	8.63	92	71
Extend	19-May	8.53	92	72
Pawnee	19-May	8.47	90	70
Olathe	19-May	8.46	90	73
Pennlate	19-May	8.41	90	77
GRAND MEAN		8.52	91	
CV (%)		7.49	2.08	
LSD (p = 0.05)		ns	2.76	
Tall Fescue				
Jesup MaxQ	23-May	9.30	91	66
Texoma MaxQ II	23-May	8.76	91	68
Kentucky 31	19-May	8.26	93	66
GRAND MEAN		8.32	91	
CV (%)		10.35	1.97	
LSD (p = 0.05)		1.24	2.59	
Ryegrass				
Boost	23-May	6.26	85	76
Albion	23-May	5.83	90	78
GRAND MEAN		5.86	81	
CV (%)		8.95	10.32	
LSD (p = 0.05)		ns	13.39	

(continued)

Table 12. 2013 Cool-season grass variety trial—Rock Springs.

Variety	First Cut Date*	2014 Total	Stand 10/27/14	30-hr NDFD
Timothy				
Derby	28-May	8.34	88	70
Summit	28-May	7.35	90	67
Crest	28-May	7.03	88	70
Climax	28-May	6.85	87	73
GRAND MEAN		7.74	88	
CV %		10.48	1.50	
LSD (p = 0.05)		1.53	1.99	

*Refers to the date when the first cutting was made in 2014. First cutting was made at late boot to early heading.

CV = coefficient of variation
LSD = least significant difference

- Seeded April 26, 2013.
- Yields (tons per acre DM Basis).
- Grand Mean, CV, and LSD values represent 37 total entries.
- Variety means are means derived from LSMeans.
- Yields indicated represent the sum of four cuttings.

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Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

Produced by Ag Communications and Marketing

Code **UC068** 12/14pod