

2008 Forage Trials Report

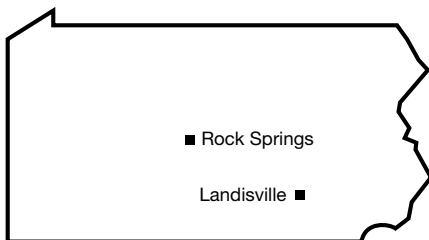


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SUMMARY

The *2008 Forage Trials Report* summarizes performance data collected from ongoing forage trials at three 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. Also included are the results of grazing trials established at the Haller Grazing Research Farm near State College. Both cool-season (forage) grasses and legumes are included in the grazing trial.



2008 Forage Growing Season

Highly variable weather is becoming the norm across Pennsylvania, with some regions suffering again this year from very dry conditions that produced very little but high-quality forage while other regions had consistent rains throughout the growing season. This fall brought more rains and warmer weather than normal, which pushed the growing season very late. Some producers were taking a sixth harvest in late October or early November. Excellent hay-making weather this year, although sporadic in some areas, was reflected by the highest number of hay samples in six years entered in the 2008 Pennsylvania Forage

and Grassland Council's Hay Show at Ag Progress Days. The average quality of the hay show samples was CP 18.5 percent, ADF 33 percent, NDF 46 percent, and RFV 135.

Growing-season precipitation amounts for the past four years at Rock Springs and Landisville are presented in Figures 1 through 8 (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 are marketed in Pennsylvania (see Tables 1, 10, and 12). 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, 12, and 14. Only varieties currently being marketed in Pennsylvania appear in the tables. Although the trials contain up to 49 total entries, many of these are advanced experimental varieties or are 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 groundcover and is given following harvest in the fall. The

stand score is reported on a scale from 1 to 100, with 100 considered to be 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 15 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 unmeasurable variations in soil fertility, soil drainage, and other environmental factors contribute to increased CV levels.

Figure 1. 2008 Precipitation at Rock Springs

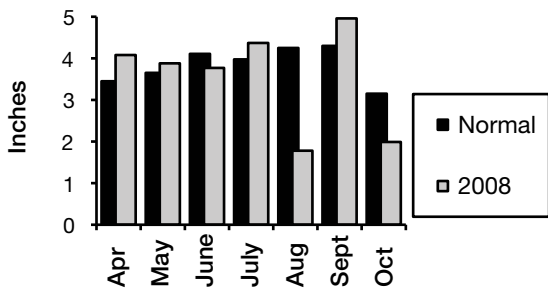


Figure 2. 2008 Precipitation at Landisville

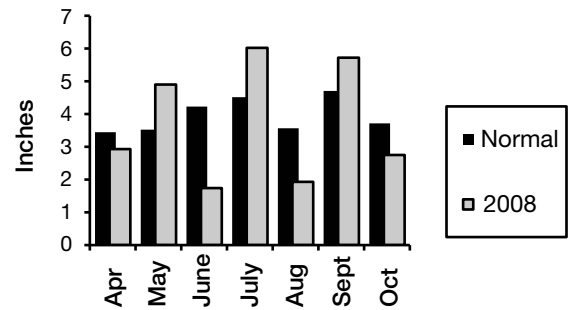


Figure 3. 2007 Precipitation at Rock Springs

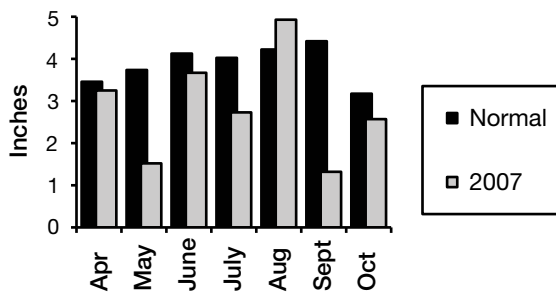


Figure 4. 2007 Precipitation at Landisville

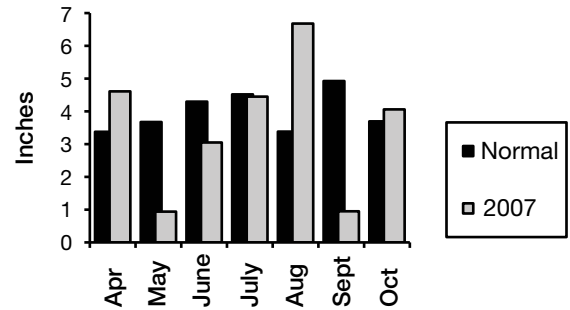


Figure 5. 2006 Precipitation at Rock Springs

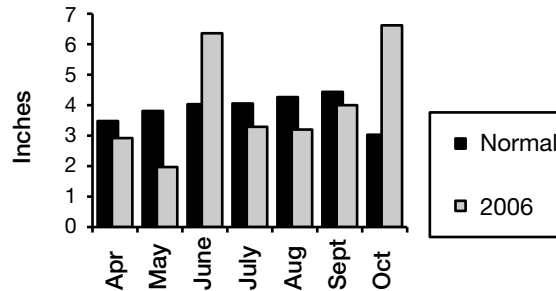


Figure 6. 2006 Precipitation at Landisville

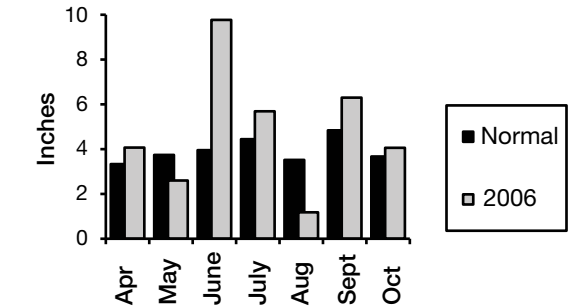


Figure 7. 2005 Precipitation at Rock Springs

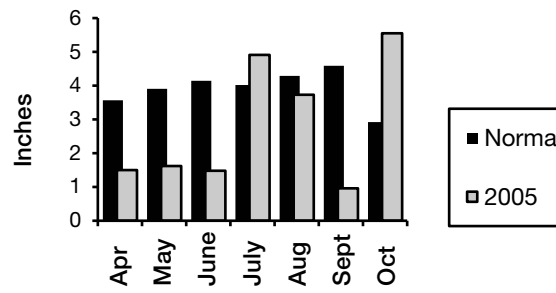
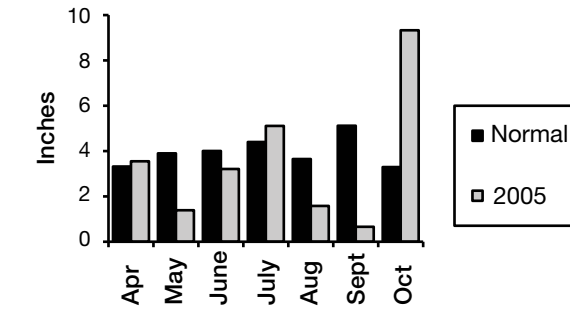


Figure 8. 2005 Precipitation at Landisville



ALFALFA

Many varieties of alfalfa exist, and selecting 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 “1” (very dormant) to “9” (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.

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 are probably 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.

Summary of Crop Conditions

Alfalfa weevil populations were generally low with few localized outbreaks. Potato leafhopper infestations were moderate across most of the state. The additive effect of the dry weather and heavy leafhopper infestations caused damage to be more pronounced than in a normal year.

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 seedlings 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*.

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 “1” (very dormant) to “9” (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 = 0–5%; LR = 6–14%; MR = 15–30%; R = 31–50%; HR = 51% or greater. If the resistance rating for a variety is not listed, the information is not available.

Variety	Marketer ^a	Fall Dormancy	Pest-Resistance Ratings						Appears in Table No.
			BW	VW	FW	AN	PRR	APH1	
4A421	Mycogen Seeds	4	HR	HR	HR	HR	HR	HR	2,3,6,7
4G418RR	Mycogen Seeds	4	HR	HR	HR	HR	HR	HR	4,8
53Q30	Pioneer Hi-Bred Int'l, Inc.	3	HR	HR	HR	HR	HR	HR	3,7
54V46	Pioneer Hi-Bred Int'l, Inc.	4	HR	HR	HR	HR	HR	HR	2,3,4,6,7,8
54V48	Pioneer Hi-Bred Int'l, Inc.								5,9
6415	Garst Seeds	4	HR	HR	HR	HR	HR	HR	2,3,5,6,7,9
6420	Garst Seeds	4	HR	HR	HR	HR	HR	HR	2,6
A 4440	Producer's Choice	5	HR	HR	HR	HR	HR	HR	3,4,8
A 5225	Producer's Choice	4	HR	HR	HR	HR	HR	HR	5,9
ADRENALIN	Brett Young Seeds	4	HR	HR	HR	HR	HR	HR	4,8
AMERISTAND 407TQ	Hyttest Seeds, P.L. Rohrer	4	HR	HR	HR	HR	HR	HR	3,4,8
ASCEND	Mid Atlantic Seeds	5	HR	HR	HR	HR	HR	HR	2,6
CHARGER	Mid Atlantic Seeds	5	HR	HR	HR	HR	HR	HR	5,9
CIMARRON VL400	Wetsel, Inc.	4	R	R	HR	HR	HR	R	2,6
DKA42-15	Dekalb	4	HR	HR	HR	HR	HR	HR	2,6
DKA43-13	Dekalb	5	HR	HR	HR	HR	HR	-	4
DOUBLE EAGLE	American Seed Co.	4	HR	HR	HR	HR	HR	HR	3,7
ENFORCER	Growmark FS	4	HR	HR	HR	HR	HR	HR	2,6
ESCALADE	Growmark FS	5	HR	R	HR	R	HR	R	2,4,6,8
FSG 351	Seedway	3	HR	R	HR	HR	HR	R	2,6
FSG 400 LH	Seedway	4	HR	HR	HR	HR	HR	HR	2,6
FSG 406	Seedway	4	HR	HR	HR	HR	HR	HR	2,6
FSG 408 DP	Seedway	4	HR	HR	HR	HR	HR	R	2,6
FSG 505	Seedway	5	HR	HR	HR	HR	HR	HR	2,6
GENOA	NK Brand/Syngenta Seeds	4	HR	HR	HR	HR	HR	HR	2,3,6,7
GUARDSMAN II	Seedway	4	HR	HR	HR	HR	HR	-	2,6
HYBRI+ 421	NC+ Hybrids	4	HR	R	HR	R	HR	R	3,7
HYBRI+JADE	NC+ Hybrids	4	HR	HR	HR	HR	HR	R	7
HYBRIFORCE-420/ WET	Dairyland Seed Co.	4	HR	R	HR	R	HR	R	2,6

(Table 1 continued)

Variety	Marketer ^a	Fall Dormancy	Pest-Resistance Ratings						Appears in Table No.
			BW	VW	FW	AN	PRR	APH1	
INTEGRITY	T.A. Seeds	4	HR	HR	HR	HR	HR	HR	2,3,6,7
JADE III	NC+ Hybrids	4	HR	R	HR	HR	HR	R	2,6
KEYSTONE	Chemgro	3	HR	-	R	HR	HR	R	5,9
KINGFISHER 30-30 Q	King's AgriSeeds	3	HR	HR	HR	HR	HR	HR	4,8
L-411HD	Legacy Seeds	4	HR	HR	HR	HR	HR	HR	2,6
L-447HD	Legacy Seeds	4	HR	R	HR	HR	HR	HR	3,7
LEGENDAIRY 5.0	Croplan Genetics	4	HR	HR	HR	HR	HR	HR	2,6
LIGHTNING EXTRA	Preferred Seed	4	HR	HR	HR	R	HR	HR	4,8
MAGNUM VI	Dairyland Seed Co.	4	HR	HR	HR	HR	HR	HR	4,8
MAGNUM VI-WET	Dairyland Seed Co.	4	HR	HR	HR	HR	HR	HR	4
MARINER III	Growmark FS	4	HR	R	HR	HR	HR	HR	2,4,8
MARVEL	Growmark FS	4	HR	HR	HR	HR	HR	HR	2,4,6,8
MILESTONE	Chemgro Seeds	3	HR	R	HR	R	HR	R	3,7
NOVA	Northstar Seeds	4	HR	R	HR	R	HR	R	2,6
ONEIDA VR	Public	3	R	HR	HR	MR	MR	-	2,3,4,5,6,7,8,9
PERFORM	Doebler's Hybrids	4	HR	HR	HR	HR	HR	HR	3,7
PERSIST II									5
PROLIFIC	Doebler's Hybrids	4	HR	HR	HR	HR	HR	HR	3,7
REBOUND 5.0	Croplan Genetics	4	HR	R	HR	HR	HR	HR	2,6
REGEN	Seedway	3	R	HR	HR	HR	R	-	2,5,6,9
STARBUCK	T.A. Seeds	3	HR	R	HR	HR	HR	HR	4,8
TS-4007	Producer's Choice	4	HR	HR	HR	HR	HR	HR	9
TS-4027	Producer's Choice	4	HR	HR	HR	HR	HR	HR	5,9
VERNAL	Public	2	R	S	MR	S	S	S	2,3,4,5,6,7,8,9
WITHSTAND	Allied Seed	4	HR	HR	HR	HR	HR	HR	4,8
WL 343 HQ	Agriculver, Hytest Seeds								
	Crop Production Services	4	HR	HR	HR	HR	HR	HR	4,8
WL 355 RR	Agriculver, Hytest Seeds,								
	Crop Production Services	5	HR	HR	HR	HR	HR	HR	4,8

a. Alfalfa marketers contact information is listed on the next page.

a. Alfalfa marketers listed in this report—location, phone number, and Web site.

AgriCulver, Inc.

Trumansburg, NY 14866
Phone: 607-387-5788

Allied Seed, LLC

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

American Seed Co.

Porter's Siding, PA 17362
Phone: 717-225-3730
Web: www.americanseedco.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

Croplan Genetics

St. Paul, MN 55164
Phone: 651-765-7510
Web: www.croplangenetics.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 Hybrids

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

Garst Seed Co.

Slater, IA
Phone: 888-464-2778
Web: www.garstseed.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

Legacy Seeds, Inc.

Manheim, PA 17545
Phone: 717-665-7655
Web: www.legacyseeds.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

NC+ Hybrids

Blairsville, PA 15717
Phone: 800-279-7999
Web: www.nc-plus.com

NK Brand/Syngenta Seeds

Golden Valley, MN 55427
Phone: 800-445-0956
Web: www.nk-us.com

Northstar Seeds

Neepawa, Manitoba ROJ 1H0, Canada
Phone: 204-476-5241
Web: www.northstarseed.com

P. L. Rohrer & Bro., Inc.

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

Pioneer Hi-Bred Int'l, Inc.

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

Preferred Seed

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

Producer's Choice

Story City, IA 50248
Phone: 866-744-5710
Web: www.producerschoiceseed.com

Seedway

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

T.A. Seeds

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

Wetsel, Inc.

Kittanning, PA 16201
Phone: 800-742-2510
Web: www.wetsel.com

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

Table 2. 2004 alfalfa variety trial—Rock Springs.

Variety	2008 Yield	2007 Yield	2006 Yield	2005 Yield	2005–08 Average	Stand 9/30/08
REBOUND 5.0	8.71	7.06	8.27	5.41	7.37	67.6
LEGENDAIRY 5.0	8.55	7.32	8.53	5.98	7.60	72.9
FSG 505	8.37	7.30	8.29	6.04	7.50	69.8
DKA42-15	8.07	6.80	8.49	6.36	7.43	67.1
FSG 351	8.04	6.99	7.96	5.57	7.14	76.1
ASCEND	7.88	6.79	7.89	5.13	6.92	71.2
MARVEL*	7.87	6.72	8.08	5.43	7.03	73.2
FSG 408 DP	7.73	6.46	7.62	5.39	6.80	69.1
MARINER III*	7.71	6.23	7.69	5.18	6.70	68.5
HYBRIFORCE-420/WET	7.63	6.42	7.85	5.56	6.87	67.2
INTEGRITY*	7.62	6.49	7.62	5.18	6.73	78.7
4A421	7.53	6.77	7.83	5.10	6.81	62.7
FSG 406	7.53	6.15	7.63	5.62	6.73	67.6
6415	7.47	6.89	8.29	5.95	7.15	67.1
54V46	7.37	6.29	7.72	5.34	6.68	71.4
ESCLADE*	7.28	6.19	7.54	5.28	6.57	65.2
6420	7.12	5.85	7.71	5.19	6.47	70.0
NOVA	7.12	5.61	7.66	5.29	6.42	69.8
JADE III	7.05	6.28	7.57	5.16	6.52	72.1
L-411HD	7.05	5.86	7.67	5.36	6.49	75.1
GENOA	6.72	6.03	7.17	4.87	6.19	66.5
CIMARRON VL400*	6.62	5.43	6.95	5.06	6.02	66.1
REGEN*	6.49	5.98	7.51	4.53	6.13	74.7
VERNAL	6.49	5.34	6.47	4.53	5.71	60.1
GUARDSMAN II*	6.45	5.69	6.63	4.27	5.76	67.6
ONEIDA VR	6.27	5.44	7.12	5.06	5.98	68.7
ENFORCER*	6.15	5.67	7.23	4.93	5.99	66.6
FSG 400 LH	5.72	4.83	6.19	3.98	5.18	66.2
GRAND MEAN	7.31	6.22	7.60	5.23	6.59	70.3
CV (%)	10.62	10.65	8.03	13.79	9.76	10.3
LSD (p = 0.05)	1.09	0.93	0.85	1.01	0.90	10.1

*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, 2004.
- Yields (tons-per-acre DM basis).
- Yields indicated represent the sum of four cuttings each year.
- 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 40 total entries.
- Variety means are adjusted means derived from nearest neighbor's analysis.
Therefore, multiple-year averages may not be the arithmetic mean of the years involved.
- Varieties are listed by rank for 2008 yield.

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

Table 3. 2005 alfalfa variety trial—Rock Springs.

Variety	2008 Yield	2007 Yield	2006 Yield	2006–08 Average	Stand 9/24/08
AMERSTAND 407TQ*	7.19	5.83	6.59	6.53	83.6
GENOA	6.96	7.15	6.62	6.91	84.0
6415	6.80	6.61	6.48	6.63	86.4
MILESTONE*	6.77	6.63	6.35	6.58	86.1
54V46	6.74	5.78	6.22	6.25	87.5
DOUBLE EAGLE	6.71	6.51	6.45	6.56	87.2
PERFORM*	6.69	6.44	6.18	6.44	85.7
4A421	6.58	6.67	6.44	6.56	86.9
HYBRI+ 421	6.42	6.01	5.88	6.10	86.9
53Q30	6.36	5.10	5.87	5.78	87.7
A 4440*	6.29	5.60	5.35	5.75	87.5
PROLIFIC	6.23	6.25	6.01	6.16	88.1
L-447HD	6.08	6.66	6.18	6.31	86.1
INTEGRITY	5.98	6.68	5.91	6.19	89.0
VERNAL	4.99	5.80	5.33	5.37	78.4
ONEIDA VR	4.82	5.03	5.22	5.02	88.2
GRAND MEAN	6.20	6.03	5.92	6.05	86.7
CV (%)	9.16	14.61	6.44	7.55	3.3
LSD (p = 0.05)	0.80	ns	0.54	0.64	4.0

*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

ns = not significant at alpha = 0.05

- Seeded April 14, 2005.
- Yields (tons-per-acre DM basis).
- Yields indicated represent the sum of four cuttings each year.
- 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.
- Variety means are adjusted means derived from nearest neighbor's analysis.
Therefore, multiple-year averages may not be the arithmetic mean of the years involved.
- Varieties are listed by rank for 2008 yield.

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

Table 4. 2006 alfalfa variety trial—Rock Springs.

Variety	2008 Yield	2007 Yield	2007–08 Average	Stand 9/29/08
AMERISTAND 407TQ	7.31	7.17	7.24	84.9
ESCALADE	6.98	7.01	7.00	87.3
DKA43-13*	6.96	6.96	6.96	85.0
LIGHTNING EXTRA	6.90	7.03	6.97	85.0
KINGFISHER 30-30 Q	6.88	7.10	6.99	85.4
WL 343 HQ	6.87	6.46	6.66	85.6
MARVEL	6.79	7.11	6.95	85.6
54V46	6.67	6.28	6.47	85.5
STARBUCK	6.67	7.21	6.93	85.6
MAGNUM VI*	6.65	7.13	6.89	86.9
4G418RR	6.60	6.43	6.52	84.7
MAGNUM VI-WET*	6.60	6.41	6.51	87.9
ADRENALIN*	6.51	6.86	6.69	85.1
MARINER III	6.42	6.37	6.39	86.0
WL 355 RR	6.11	6.27	6.19	87.0
A4440	5.86	6.52	6.19	90.1
WITHSTAND	5.84	5.81	5.83	85.6
ONEIDA VR	5.73	6.33	6.03	87.1
VERNAL	4.75	5.21	4.98	85.1
GRAND MEAN	6.50	6.57	6.53	86.5
CV (%)	10.08	9.19	8.94	1.9
LSD (p = 0.05)	0.92	0.85	0.82	2.3

*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 12, 2006.
 - Yields (tons-per-acre DM basis).
 - Yields indicated represent the sum of four cuttings each year.
 - 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 38 total entries.
 - Variety means are adjusted means derived from nearest neighbor's analysis.
- Therefore, multiple-year averages may not be the arithmetic mean of the years involved.
- Varieties are listed by rank for 2008 yield.

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

Table 5. 2007 alfalfa variety trial—Rock Springs.

Variety	2008 Yield	Stand 9/25/08
PERSIST II*	8.53	89.6
55V48	8.31	88.3
A 5225	8.26	87.4
KEYSTONE*	7.87	88.0
6415	7.85	89.7
CHARGER	7.73	89.6
TS-427	7.62	86.8
REGEN	7.44	90.5
ONEIDA VR	7.08	86.1
VERNAL	5.97	86.7
GRAND MEAN	7.69	88.3
CV (%)	6.75	3.0
LSD (p = 0.05)	0.73	3.7

*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 24, 2007.
- Yields (tons-per-acre DM basis).
- Yields indicated represent the sum of 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.
- Variety means are adjusted means derived from nearest neighbor's analysis.
- Varieties are listed by rank for 2008 yield.

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

Table 6. 2004 alfalfa variety trial—Landisville.

Variety	2008 Yield	2007 Yield	2006 Yield	2005 Yield	2005–08 Average	Stand 10/7/08
6415	8.29	7.63	7.73	7.15	7.70	68.8
REBOUND 5.0	8.23	7.41	7.48	6.92	7.51	69.3
FSG 505	7.96	7.50	7.62	6.87	7.49	71.8
LEGENDAIRY 5.0	7.89	8.05	7.59	6.80	7.58	70.1
HYBRIFORCE-420/WET	7.84	7.42	7.39	6.53	7.30	74.9
FSG 351	7.81	7.47	7.48	6.95	7.43	75.9
54V46	7.78	7.65	7.71	7.17	7.58	71.3
GENOA	7.52	7.46	7.57	6.97	7.38	64.6
ESCLADE*	7.37	6.72	7.12	7.05	7.06	70.1
MARVEL*	7.32	7.06	7.50	7.01	7.22	68.6
JADE III	7.27	6.70	6.72	5.92	6.65	76.2
FSG 408 DP	7.18	6.67	6.62	6.25	6.68	70.4
DKA42-15	7.17	7.20	7.33	6.81	7.13	69.0
ASCEND	7.10	6.42	6.94	6.18	6.66	70.9
4A421	7.08	7.27	7.36	6.74	7.11	69.1
REGEN*	7.08	6.00	6.88	6.42	6.59	70.5
6420	6.99	6.46	6.70	5.98	6.53	70.7
L-411HD	6.77	6.45	6.92	6.72	6.71	69.9
FSG 406	6.76	6.16	6.62	6.38	6.48	67.1
ONEIDA VR	6.50	6.12	6.34	6.24	6.30	74.6
INTEGRITY*	6.42	5.96	6.41	5.88	6.16	72.4
NOVA	6.40	6.19	6.77	6.26	6.41	67.0
GUARDSMAN II*	6.27	5.81	6.03	6.16	6.07	67.5
FSG 400 LH	5.98	5.63	6.23	5.90	5.94	62.7
CIMARRON VL400*	5.94	5.71	6.56	6.06	6.07	68.8
VERNAL	5.19	4.93	5.80	5.30	5.31	66.7
ENFORCER*	5.15	4.69	5.66	5.49	5.24	62.9
GRAND MEAN	7.10	6.66	6.96	6.45	6.79	70.4
CV (%)	6.76	7.68	6.17	5.75	5.79	5.2
LSD (p = 0.05)	0.67	0.72	0.60	0.52	0.55	5.1

*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 21, 2004.
- Yields (tons-per-acre DM basis).
- Yields indicated represent the sum of four cuttings in 2005 and five cuttings each year in 2006, 2007, and 2008.
- 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.
- Variety means are adjusted means derived from nearest neighbor's analysis.
Therefore, multiple-year averages may not be the arithmetic mean of the years involved.
- Varieties are listed by rank for 2008 yield.

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

Table 7. 2005 alfalfa variety trial—Landisville.

Variety	2008 Yield	2007 Yield	2006 Yield	2006–08 Average	Stand 10/7/08
HYBRI+JADE*	7.84	7.03	8.09	7.66	88.4
GENOA	7.70	7.23	8.22	7.71	84.2
DOUBLE EAGLE	7.31	6.69	7.80	7.27	81.7
4A421	7.30	6.73	7.88	7.30	83.7
MILESTONE*	7.20	6.40	7.45	7.02	85.2
54V46	7.19	6.60	7.79	7.19	85.0
PROLIFIC	7.17	6.09	7.57	6.94	85.2
L-447HD	7.13	6.40	7.67	7.07	84.0
HYBRI+ 421	7.07	6.52	7.93	7.17	86.5
PERFORM*	7.07	6.46	7.65	7.06	86.0
53Q30	7.01	6.38	7.47	6.96	82.8
6415	6.89	6.77	7.96	7.21	82.6
INTEGRITY	6.73	6.20	7.43	6.79	88.2
ONEIDA VR	6.30	5.82	7.29	6.47	86.6
VERNAL	5.62	5.12	6.36	5.70	81.5
GRAND MEAN	7.01	6.32	7.54	6.95	85.3
CV (%)	5.07	5.93	5.09	4.70	2.5
LSD (p = 0.05)	0.50	0.53	0.54	0.46	3.0

*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 13, 2005.
- Yields (tons-per-acre DM basis).
- Yields indicated represent the sum of five cuttings each year.
- 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 26 total entries.
- Variety means are adjusted means derived from nearest neighbor's analysis.
Therefore, multiple-year averages may not be the arithmetic mean of the years involved.
- Varieties are listed by rank for 2008 yield.

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

Table 8. 2006 alfalfa variety trial—Landisville.

Variety	2008 Yield	2007 Yield	2007–08 Average	Stand 11/8/08
WL 343 HQ	7.75	7.14	7.45	83.6
AMERISTAND 407TQ	7.71	7.34	7.52	82.5
54V46	7.57	7.16	7.36	86.4
ESCALADE	7.52	7.02	7.27	85.8
MARVEL	7.36	7.77	7.57	80.7
ADRENALIN*	7.33	6.93	7.13	81.1
STARBUCK	7.28	6.91	7.10	84.7
A 4440	7.22	6.70	6.96	83.9
MAGNUM VI*	7.19	6.99	7.09	84.0
LIGHTNING EXTRA	7.12	7.10	7.11	81.8
MARINER III	6.97	7.14	7.05	84.3
4G418RR	6.92	6.71	6.81	82.1
WL 355 RR	6.76	6.60	6.68	84.8
WITHSTAND	6.36	5.87	6.11	84.2
KINGFISHER 30-30 Q	6.25	6.06	6.16	82.4
ONEIDA VR	6.18	6.37	6.28	84.4
VERNAL	5.57	5.60	5.59	79.4
GRAND MEAN	7.07	6.89	6.98	83.3
CV (%)	6.09	6.38	5.61	4.0
LSD (p = 0.05)	0.60	0.62	0.55	4.6

*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 18, 2006.
- Yields (tons-per-acre DM basis).
- Yields indicated represent the sum of five cuttings each year.
- 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.
- Variety means are adjusted means derived from nearest neighbor's analysis.
Therefore, multiple-year averages may not be the arithmetic mean of the years involved.
- Varieties are listed by rank for 2008 yield.

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Table 9. 2007 alfalfa variety trial—Landisville.

Variety	2008 Yield	Stand 10/8/08
A 5225	7.99	92.6
6415	7.88	93.5
55V48	7.73	94.2
TS-4027	7.73	89.9
KEYSTONE*	7.43	90.0
CHARGER	7.38	92.1
TS-4007	7.35	91.8
REGEN	7.15	93.2
ONEIDA VR	6.62	91.6
VERNAL	6.09	91.3
GRAND MEAN	7.42	92.0
CV (%)	7.16	2.1
LSD (p = 0.05)	0.75	2.7

*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 23, 2007.
- Yields (tons-per-acre DM basis).
- Yields indicated represent the sum of 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 32 total entries.
- Variety means are adjusted means derived from nearest neighbor's analysis.
- Varieties are listed by rank for 2008 yield.

COOL-SEASON GRASSES

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 lists cool-season grass varieties in our testing program that are currently marketed in Pennsylvania. Tables 11 and 12 offer guidelines for assessing the production potential of various cool-season grass varieties once the species has been chosen.

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

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

Species/Variety	Ploidy/Species	Marketer ^a	Appears in Table No.
Bromegrass			
BigFoot	Brome, Hybrid	Grassland Oregon	11
Saratoga	Brome, Smooth	Public	11
Fescue			
Advance MaxQ	Fescue, Tall	Pennington Seed	11
Jessup MaxQ	Fescue, Tall	Pennington Seed	11
Kentucky 31	Fescue, Tall	Public	11
Orchardgrass			
Ambrosia		Ernst Conservation Seeds	11
Harvestar		Columbia Seeds	11
Pennlate		P.L. Rohrer, Public	11
Ryegrass			
Boost	Tetraploid Perennial	Seedway	11
Full Throttle	Tetraploid Perennial	Columbia Seeds	11
Tetrelite II	Tetraploid Hybrid	DLF International Seeds	11
Timothy			
Climax		P.L. Rohrer, Public	11
Crest		Seedway	11
TM 9701		Allied Seed	11

a. Forage grass marketers contact information is listed on the next page.

a. Forage grass marketers listed in this report—location, phone number, and Web site.

Allied Seed, LLC

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

Columbia Seeds

Corvallis, OR 97330
Phone: 541-757-1468

DLF International Seeds

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

Ernst Conservation Seeds

Meadville, PA 16335
Phone: 800-873-3321
Web: www.ernstseed.com

Grassland Oregon

Keizer, OR 97307
Phone: 503-566-9900

P. L. Rohrer & Bro., Inc.

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

Pennington Seed

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

Seedway

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

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

Table 11. 2006 cool-season grass variety trial—Rock Springs.

Species	Variety	Ploidy/Species	2008 Yield	2007 Yield	2007-08 Average	Date of 1st cutting ^a	Stand 10/23/08
Bromegrass							
	BigFoot	Brome, Hybrid	5.37	3.84	4.59	5/23	83.0
	Saratoga	Brome, Smooth	4.70	2.74	3.71	5/28	85.8
Fescue							
	Kentucky 31	Fescue, Tall	5.83	3.70	4.77	5/28	96.4
	Jessup MaxQ	Fescue, Tall	5.27	3.65	4.47	5/23	94.4
	Advance MaxQ	Fescue, Tall	3.72	3.00	3.37	5/23	91.5
Orchardgrass							
	Pennlate		4.52	4.10	4.31	5/23	89.1
	Harvestar		4.33	3.50	3.91	6/5	86.5
	Ambrosia		4.17	3.87	4.02	5/28	84.4
Ryegrass							
	Tetrelite II	Tetraploid/Hybrid	3.47	1.88	2.67	6/5	84.0
	Boost	Tetraploid/Perennial	3.36	2.14	2.74	6/5	87.9
	Full Throttle	Tetraploid/Perennial	2.20	1.52	1.85	5/23	93.1
Timothy							
	TM9701		4.29	4.13	4.20	6/5	90.3
	Climax		4.07	3.24	3.64	6/10	85.1
	Crest		3.99	3.43	3.69	6/5	68.5
GRAND MEAN			4.54	3.35	3.94		89.6
CV (%)			10.09	12.05	8.51		4.3
LSD (p = 0.05)			0.64	0.56	0.47		5.4

a. Refers to the date when the first cutting was made in 2006. First cutting was made at late boot to early heading.

CV = coefficient of variation

LSD = least significant difference

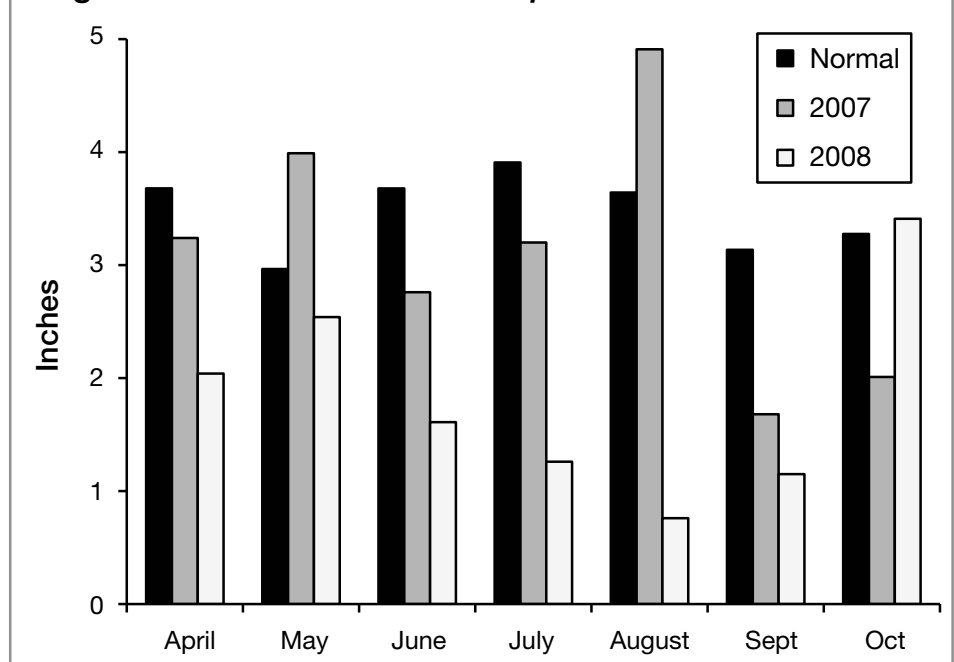
- Seeded April 13, 2006.
- Yields (tons-per-acre DM basis).
- Yields indicated represent the sum of four cuttings each year.
- Grand mean, CV, and LSD values represent 49 total entries.
- Variety means are adjusted means derived from nearest neighbor's analysis.
Therefore, multiple-year averages may not be the arithmetic mean of the years involved.
- Stand score based on a scale from 1 to 100. A 100 is considered to be a perfect stand.
- Varieties are listed by rank within species for 2008 yield.

FORAGE GRAZING TRIAL

Forage variety evaluation under grazing is done at the Haller Farm near State College, Pennsylvania. This year's report contains the results from a trial seeded in August 2006. Grazing began the spring after seeding. All entries from each forage species were blocked together so that each species block could be grazed independently of other species, thus eliminating animal grazing preference between forage species. Fertility was maintained at optimum based on soil test recommendations.

Nitrogen as urea was applied at 75 lb/acre at green-up in the spring, in June, and again in September. Grazing was initiated when the average height of a species block reached 10 inches. Cow-calf pairs of mixed breeds were used to graze. Samples were collected pre- and postgrazing at a 3-inch height to determine dry matter yield and provide an estimate of rejection for each entry. After grazing, solid manure was removed from all plots and the area was clipped (when needed) to a uniform 3-inch height using a disk mower. Herbicides were applied as needed to control invading weed species.

Figure 9. 2007 and 2008 Precipitation at Haller Farm



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

Table 12. Varieties, endophyte level, ploidy level, and marketers of forage species evaluated under grazing.

Species/Variety	Endophyte ^a /Ploidy	Marketer ^b
Orchardgrass		
Ambrosia		Ernst Conservation Seeds
Olympia		Pennington Seed
Pennlate (check)		P.L. Rohrer
Tekapo		P.L. Rohrer; Ampac
Ryegrass		
Bar 1M	NI/Diploid	Barenbrug
Barruti (check)	NI/Diploid	Barenbrug
Boost	NI	Seedway
Mara	NI/Diploid	Barenbrug
Tall Fescue/Festulolium		
Advance MaxQ	NT	Pennington Seed
Agula	Festulolium/NI	Allied Seed
Biarianne (check)	NI	Barenbrug
Barolex (check)	NI	Barenbrug
Bonus	Festulolium/NI	Growmark FS
Duo (check)	Festulolium/NI	P.L. Rohrer; Ampac
Gain	Festulolium/NI	Seedway
Jessup MaxQ	NT	Pennington Seed
Savory	NI	DLF International Seeds
Select (check)	NI	Allied Seed

(Table 12 continued)

Species/Variety	Endophyte ^a /Ploidy	Marketer ^b
Timothy		
Climax (Check)		P.L. Rohrer
Derby (Check)		Allied Seed
Summit		Seedway
Alfalfa		
FSG 408DP		Seedway
Radiant (check)		P.L. Rohrer
White Clover		
Alice		Barenbrug
Pinnacle		Seedway
RegalGraze		King's AgriSeed
Resolute		Seedway; Growmark FS

a. NI = noninfected; NT = nontoxic endophyte

b. Marketers listed in this report—location, phone number, and Web site.

Allied Seed

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

DLF International Seeds

Albany, OR 97348
Phone: 541-369-2251
Web: www.dlfis.com

Pennington Seed

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

Ampac Seed Company

State College, PA 16803
Phone: 814-234-7930
Web: www.ampacseed.com

Ernst Conservation Seeds

Meadville, PA
Phone: 800-873-3321
Web: www.ernstseed.com

P.L. Rohrer & Bro., Inc.

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

Barenbrug USA

Tangent, OR 97389
Phone: 800-547-4101
Web: www.barusa.com

Growmark FS

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

Seedway

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

King's AgriSeeds

Ronks, PA 17572
Phone: 717-687-6224

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Table 13. 2006 grazing variety trial—Haller Farm, State College, Pennsylvania.

Species/Variety	% Stand 10/15/07	% Stand 4/2/08	Ht. (inches) 4/2/08	Graze dates in 2008	Forage Consumed (lbs/acre)			2008 Total	2007 Total	% Stand 11/3/08
					2008 Spring	2008 Summer	2008 Fall			
Orchardgrass										
Ambrosia	81	84	7.5	4/29, 5/28	3,567	2,353	1,620	7,540	5,442	77
Olympia	89	89	9.0	6/16, 7/14	3,893	1,895	1,553	7,341	6,236	80
Pennlate ("check" variety)	86	91	8.8	9/8, 10/10	3,882	2,182	1,609	7,672	5,790	76
Tekapo	82	83	7.5		3,528	2,226	1,636	7,391	4,366	76
Grand Mean	82	84	7.6		3,704	2,136	1,595	7,435	4,801	75
CV (%)	7	7	7		7	18	22	9	15	8
LSD (p = 0.05)	NS	NS	0.7		408	NS	NS	NS	1,030	NS
Ryegrass										
Barruti	92	94	5.8	5/14, 6/11	3,004	723	1,423	5,150	4,560	82
BG34 ("check" variety)	89	86	5.5	7/14, 9/23	3,765	973	1,696	6,434	5,112	83
Boost	87	90	6.5	10/27	3,463	717	1,063	5,243	5,455	73
Mara	93	92	5.8		2,975	956	1,336	5,266	5,675	87
Grand Mean	91	90	5.6		3,218	838	1,418	5,474	4,527	83
CV (%)	3	4	12		17	17	20	12	35	7
LSD (p = 0.05)	4	NS	NS		NS	NS	NS	NS	NS	8
Tall Fescue/Festulolium										
Advance MaxQ	91	91	7.8	5/5, 6/2	3,737	2,001	1,053	6,791	5,940	79
Agula	80	81	6.5	7/7, 8/14	3,216	649	222	4,087	5,835	71
Barienne ("check" variety)	90	92	5.5	9/25	3,030	897	197	4,124	5,115	82
Barolex ("check" variety)	92	93	5.8		3,545	1,995	1,152	6,692	5,766	91
Bonus	84	84	6.5		2,888	525	321	3,733	5,016	74
Duo ("check" variety)	87	82	5.8		3,092	506	110	3,709	6,771	65
Gain	83	88	6.3		3,433	810	92	4,335	5,717	68
Jessup MaxQ	95	95	6.8		3,967	2,311	1,066	7,343	7,249	87
Savory	93	92	5.5		2,919	1,511	1,010	5,439	4,067	89
Select ("check" variety)	95	95	7.0		3,973	2,317	1,146	7,436	6,982	86
Verdant	94	92	8.5		3,712	1,920	1,134	6,766	5,258	84
Grand Mean	92	92	6.6		3,564	1,730	808	6,102	6,182	82
CV (%)	4	5	14		11	27	34	15	28	7
LSD (p = 0.05)	5	7	1.3		543	648	386	1,324	NS	8
Timothy										
Climax ("check" variety)	70	80	4.8	5/14, 6/11	2,960	820	860	4,640	2,742	65
Derby ("check" variety)	75	88	7.5	7/14, 9/23	3,359	933	1,079	5,370	5,404	68
Summit	72	86	7.3		3,292	938	1,135	5,365	4,865	68
Grand Mean	71	85	6.5		3,204	897	1,024	5,125	4,337	67
CV (%)	10	3	6		9	35	15	9	13	8
LSD (p = 0.05)	NS	5	0.6		NS	NS	NS	NS	981	NS

(Table 13 continued)

Species/Variety	% Stand 10/15/07	% Stand 4/2/08	Ht. (inches) 4/2/08	Graze dates in 2008	Forage Consumed (lbs/acre)			2008 Total	2007 Total	% Stand 11/3/08
					2008 Spring	2008 Summer	2008 Fall			
Alfalfa										
FSG 408DP	80	73	6.3	5/28, 6/30	1,946	3,102	741	5,789	9,235	82
Radiant ("check" variety)	82	76	6.3	7/26, 9/8	2,154	2,860	779	5,794	10,195	81
Grand Mean	81	75	6.3		2,050	2,981	760	5,791	9,715	81
CV (%)	6	13	0		14	5	23	3	5	5
LSD (p = 0.05)	NS	NS	0		NS	NS	NS	NS	NS	NS
White Clover										
Alice	89	56	1.0	5/28, 6/30	862	353	0	1,215	2,781	0
Pinnacle	89	54	1.3	7/26, 9/8	745	532	0	1,278	3,402	0
RegalGraze	81	44	1.0		736	508	0	1,244	3,269	0
Resolute	91	54	1.0		523	363	0	886	2,296	0
Grand Mean	87	52	1.1		716	439	0	1,156	2,937	0
CV (%)	8	28	24		32	33	0	28	18	0
LSD (p = 0.05)	NS	NS	NS		NS	NS	0	NS	NS	0

- Seeded August 22, 2006.

- Forage consumed (pounds-per acre DM basis); spring (all grazings before June 15), summer (all grazings between June 16 and August 31), fall (all grazings after September 1). Amount of forage consumed by grazing animals was equivalent to forage available because high stocking density did not allow animal preference.

- Varieties within a species are listed alphabetically.

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Agricultural Research and Cooperative Extension

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