



2019

Washington State Hay Growers Association

ALFALFA VARIETY TRIALS

QUALITY RESULTS

Conducted by Washington State University Extension

Steve Norberg, Regional Forage Specialist
Washington State University Extension
Franklin County Extension Office
404 West Clark Street
Pasco, WA 99301
Phone: 509-545-3511
E-mail: s.norberg@wsu.edu

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The WSHGA-WSU goal for the alfalfa variety testing project is to identify varieties for growers that are adapted to the Columbia Basin region that will tolerate both biotic (pests) and abiotic (environmental) stresses and still yield well. The goal of this annual publication is to provide growers and industry the best, most reliable quality results possible.

Nine alfalfa trials were harvested for yield in irrigated central Washington State in 2019. The Washington State Hay Growers Association (WSHGA) sanctions the trials and contracts with Washington State University (WSU) Extension to conduct and report the research. Three conventional trials are conducted near Othello, WA and three conventional and three Roundup Ready™ (RR) trials near Pasco, WA. **The trials are named by the year the fall planting occurred.**

For 2016, 2017 and 2018 trials, the Othello site is located on the WSU Othello research farm 6 miles ESE of Othello, WA at Lat: N46°47'41" Lng: W119°02'33", at an elevation of 1154 feet. A new Pasco site was established in fall 2016 with both the 2016, 2017 and 2018 plantings established at 3128 Ivy Road, Pasco, WA at Lat: 46°17'51.01"N Lng: 119° 8'22.40"W with an elevation of 446 ft.

Soil series are a Shano silt loam (coarse-silty, mixed-mesic Xerollic Camborthids) at Othello, and Sagehill very fine sandy loam (coarse-loamy, mixed, mesic Xerollic Camborthids) at the Garfield Road location and a Quincy loamy fine sand (Xeric Torripsamments) at the Ivy Road location. All trials were sprinkler irrigated throughout the April-October growing season. The frost-free (32°F) period at Othello averages 180 days and 209 days at Pasco.

Each trial is arranged in a randomized complete block (RCB) design with 4 replications. All are seeded at 22 lbs/ac in rows spaced 6 inches apart with a 1-foot inter-plot separation. Plot size is 4 x 15 feet. The trials contain some experimental entries that are not available for commercial planting. Forage yields are collected for each submitted entry for three years on each planting.

Coefficient of Variation or “CV” is estimated using statistics and gives an estimate of the variability in the field. The lower the number the less variation in the measurements taken and the more likely you can determine a significant difference between treatments. Least significant difference or “LSD” is used to determine if the varieties are statistically different from each other. If the difference between two treatment means is greater than the LSD then you can determine that one variety yielded greater than another with a high level of confidence (90% for LSD at 0.10). For the longest yield duration in the table, I highlight in yellow the yields of the varieties that yielded statistically similar to the highest yielding variety using the LSD method.

Tables 1 - 3 contain a summary of annual total of yields for alfalfa varieties since the fall planting in 2012 to 2014 at the Pasco and Othello locations. Yields are presented in percent of mean of the test for ease of comparison. Table 4 is from: NAFA’s “Winter Survival, Fall Dormancy & Pest Resistance Ratings for Alfalfa Varieties – 2020 Edition and previous editions”. For a complete copy of the NAFA document visit www.alfalfa.org/varietyLeaflet.php.

Forage yields for each harvest, total season yield for 2019 and the totals for all years of the trials from those planted in the fall of 2016 to date are reported in Tables 5 through 13. Yields are determined from whole plot fresh weights converted to a 100% dry matter basis using a constant dry matter fraction of 20%.

Ratings for regrowth after 5th cutting were taken on September 17 and 27, 2019 for the Pasco and Othello locations, respectively, and represent visual ratings from 1-5. Rating scale was: 1 - little to no regrowth, 2 - below average regrowth, 3 - average regrowth, 4 - above average regrowth, and 5 - high amount of regrowth. At the end of each experiment final stands were evaluated for percent stand. This was determined by visually determining how many 6-inch gaps were found between plants in each of the seeded rows compared to the number of 6-inch blocks there are in a plot and calculating the percentage.

This is the second year of data on first cutting quality samples was funded by seed companies and results can be seen in Tables 14 through 22. A method of determining nutrient and fiber value was used according to Dr. Wiess, Nutritionist, who spoke on “Innovations in Forage Digestibility Analyses/Changing Concepts of Forage Quality” at the 2017 and 2019 Western Alfalfa and Forage Symposium and can be viewed at <https://alfalfa.ucdavis.edu/+symposium/2017/workshop.aspx> and select the talk at 1:15 pm. This method allows a total dollar value of hay to be calculated on each variety. The numbers given is based on an “as fed” basis with values based in the Midwest since none were available for the PNW. Values for: protein, energy, fiber, and an adjustment for fiber fill effect on dairy cow milk production. This method provides the hay a value to the dairy industry, which is the main ultimate use of our high-quality hay. Maybe you will be surprised that even for dairies protein brings more value than energy contained in the hay. I would be happy to try to answer any questions on how the numbers were calculated.

I want to especially thank Erin Mackey, Obadiah Sheriff, Gisela Guzman-Rivas, Kylie Beaver, Jennifer Cantu, Jason Mieirs, Steve Fransen, Josefina Guzman, Leann Norberg and Bailey Young for their assistance with this year’s trials and planting of next year’s trials. I also want to thank the Washington State Hay Growers Association and Washington State University Extension for their continued support.

Please don’t hesitate to contact me if you have any questions on the trials. My email is: s.norberg@wsu.edu.

Sincerely,

A handwritten signature in cursive script that reads "Steve Norberg". The signature is written in black ink and is positioned above the typed name.

Regional Forage Specialist

TABLE 1. 2019 SUMMARY OF CONVENTIONALLY SPRAYED ALFALFA YIELD TRIALS PLANTED SINCE FALL OF 2015 AT WSU OTHELLO RESEARCH FARM, WA

Entry	Seeded August 2014				Seeded August 2015				Seeded August 2016				6 YR Avg. of 2014 & 2015 Trials	6 YR Avg. of 2014 & 2016 Trials	6 YR Avg. of 2015 & 2016 Trials
	2015	2016	2017	3 Yr.	2016	2017	2018	3 Yr.	2017	2018	2019	3 Yr.			
8420									98.3%	95.4%	92.5%	95.4%			
4H400* (CW 054004)									105.1%	109.9%	101.5%	105.6%			
54Q29									104.7%	106.2%	106.5%	105.8%			
55Q27	101.9%	111.0%	113.3%	108.1%											
AFX 429*									103.8%	99.8%	105.7%	103.0%			
AFX 457*									96.2%	98.4%	90.3%	95.0%			
AFX 469*									104.8%	103.4%	119.6%	109.1%			
AFX 579*									99.0%	108.2%	116.2%	107.8%			
AmeriStand 427TQ	98.0%	107.1%	104.2%	102.8%	104.5%	102.6%	111.7%	106.3%	96.9%	99.2%	106.5%	100.8%	104.6%	101.8%	103.6%
AmeriStand 445NT					98.1%	98.0%	100.7%	99.0%	96.9%	96.5%	95.8%	96.4%			97.7%
Camas	100.4%	112.3%	112.3%	107.7%											
CB11007*	103.0%	94.1%	100.2%	99.2%					96.3%	97.5%	96.7%	96.8%		98.0%	
CB11009*	101.9%	91.7%	80.7%	92.7%	96.5%	97.3%	77.5%	90.3%					91.5%		
CW 093009*									95.3%	99.6%	96.5%	97.2%			
CW 105021*									94.8%	102.8%	99.3%	99.1%			
DG5315									105.8%	103.4%	107.2%	105.4%			
DS1168*									99.8%	98.8%	106.3%	101.6%			
FG 48W214*	100.8%	106.9%	106.9%	104.6%											
FSG 415BR	106.7%	103.4%	103.4%	104.6%											
FSG426					109.2%	110.1%	114.8%	111.4%							
GrandsStand II					97.9%	98.7%	124.0%	107.0%							
HG 4001*									100.2%	110.2%	106.5%	105.7%			
HibriForce-3400*									101.2%	98.7%	99.3%	99.7%			
Hi-Gest 360*	99.2%	99.4%	103.2%	100.3%					99.7%	102.7%	95.6%	99.4%	100.3%	99.9%	
HybriForce-3420/Wet*									104.9%	104.4%	100.0%	103.1%			
HybriForce-3430*									104.6%	97.6%	93.5%	98.5%			
HybriForce-4400*									103.6%	105.3%	101.7%	103.6%			
Magnitude	99.5%	105.2%	103.5%	102.6%											

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Entry	Seeded August 2014				Seeded August 2015				Seeded August 2016				6 YR Avg. of	6 YR Avg. of	6 YR Avg. of
	2015	2016	2017	3 Yr.	2016	2017	2018	3 Yr.	2017	2018	2019	3 Yr.	2014 & 2015 Trials	2014 & 2016 Trials	2015 & 2016 Trials
Mallard*									102.5%	98.5%	91.6%	97.6%			
msSunstra-143146*									98.3%	99.2%	93.3%	96.9%			
PGI 529*									108.2%	112.0%	112.6%	110.9%			
PGI 557*									99.0%	106.5%	103.7%	103.1%			
Rebound 6XT									100.3%	100.5%	112.9%	104.5%			
SGS 47M	105.1%	111.0%	107.3%	107.7%	105.9%	106.8%	100.4%	104.4%					106.1%		
SW4107					108.6%	109.5%	106.3%	108.1%							
SW4328	102.3%	98.3%	99.1%	100.0%											
SW4332*	101.5%	98.9%	103.1%	101.0%											
SW5210									102.5%	98.2%	102.1%	100.9%			
SW5213					107.4%	108.3%	101.6%	105.7%	103.3%	101.5%	101.1%	102.0%			103.8%
SW5512Y					96.6%	97.4%	97.9%	97.3%							
Vernal	82.9%	72.3%	71.9%	76.3%	77.0%	77.6%	76.7%	77.1%	84.2%	76.3%	67.3%	75.9%	76.7%	76.1%	76.5%
Vernema	94.3%	81.0%	83.4%	86.8%	94.0%	90.5%	80.0%	88.1%	83.9%	69.1%	73.3%	75.3%	87.4%	81.0%	81.7%
WL 354HQ	102.5%	107.5%	107.5%	105.6%											
WL 365HQ									106.2%	104.3%	115.6%	108.6%			

Total-Tons/Acre	10.77	9.68	7.50	27.95	8.45	8.38	8.62	25.45	10.06	10.70	10.06	30.8			
LSD (0.10)	5.2%	5.6%	5.6%	4.5%	6.5%	7.6%	15.2%	8.1%	5.3%	6.2%	6.2%	4.0%			
CV (%)	4.3%	4.7%	4.7%	3.8%	5.4%	6.4%	12.7%	6.8%	6.2%	7.9%	7.3%	4.54%			

TABLE 2. 2019 SUMMARY OF CONVENTIONALLY SPRAYED ALFALFA YIELD TRIALS PLANTED SINCE FALL OF 2014 - NEAR PASCO, WA

Entry	Seeded August 2014				Seeded August 2015			Seeded August 2016				5 YR	5 YR	6 YR
	2015	2016	2017	3 Yr.	2016	2017	2 Yr.	2017	2018	2019	3 Yr.	Avg. of Seeded 14 & 15	Avg. of Seeded 15 & 16	Avg. of Seeded 14 & 16
54Q29								108.4%	107.6%	108.2%	108.0%			
55Q27	106.1%	106.0%	107.5%	106.5%										
55VR05**	104.6%	105.4%	108.5%	106.0%										
AmeriStand 427TQ	99.9%	100.6%	108.9%	102.8%				98.7%	97.6%	109.5%	101.3%			102.0%
Ameristand 445NT								100.7%	101.8%	102.6%	102.0%			
Camas	103.4%	104.5%	113.2%	106.7%	98.3%	99.8%	99.0%					102.8%		
CB11001	98.1%	98.0%	99.0%	98.3%										
CB11007*	105.3%	104.9%	109.2%	106.3%				98.1%	93.5%	94.4%	95.4%			100.9%
CB1109*					102.2%	96.2%	99.4%	94.9%	90.1%	94.3%	93.0%		96.2%	
DG 5315					104.1%	111.7%	107.6%	100.9%	103.2%	104.9%	102.8%		105.2%	
FG 48W214*	104.5%	105.3%	112.5%	107.1%										
GrandStand II					107.0%	108.0%	107.4%							
Hi-Gest 660	93.9%	95.9%	106.1%	98.2%										
Integra 8420					108.2%	109.6%	108.9%	99.8%	107.3%	102.6%	103.3%		106.1%	
L-504 HD								97.6%	90.9%	95.0%	94.4%			
Rebound 6XT								101.4%	105.4%	109.5%	105.1%			
Robin								97.4%	96.4%	91.7%	95.5%			
SGS 47M	98.5%	100.2%	103.6%	100.6%										
SW 4107					103.1%	105.2%	104.1%							
SW 4328	100.5%	99.6%	94.1%	98.3%										
SW 4332*	102.6%	101.8%	104.3%	102.8%										
SW 5210*								107.2%	111.1%	105.5%	108.2%			
SW 5212Y*					97.0%	94.2%	95.7%							
SW 5213					97.8%	93.8%	95.9%	110.6%	109.1%	113.5%	110.8%		103.4%	
Vernal	82.8%	80.7%	55.8%	74.2%	80.2%	75.1%	77.8%	82.5%	80.7%	75.0%	79.8%	76.0%	78.8%	77.0%
Vernema	102.8%	100.4%	80.1%	95.3%	94.1%	87.5%	91.0%	93.0%	91.2%	85.4%	90.2%	93.2%	90.6%	92.8%
WL 365HQ					99.9%	109.6%	104.4%							
WL 377HQ					108.2%	109.4%	108.8%							

Total Tons/Acre	10.76	10.09	8.67	29.52	11.44	10.01	21.44	10.20	10.20	7.30	27.65			
LSD Years (0.10)	7.5%	8.0%	8.7%	6.6%	6.7%	7.6%	6.3%	7.6%	7.9%	8.8%	5.8%			
CV(%)	6.3	6.8	7.2	5.6	5.6	6.4	5.3	6.3%	6.6%	7.4%	4.8%			

TABLE 3. 2018 SUMMARY OF ROUNDUP SPRAYED ALFALFA YIELD TRIALS PLANTED SINCE 2012 - NEAR PASCO, WA

Entry	Seeded August 2014				Seeded August 2015			Seeded August 2016				5 YR Avg.	5 YR Avg.	6 YR Avg.
	2015	2016	2017	3 Yr.	2016	2017	2Yr.	2017	2018	2019	3Yr.	Seeded 14 & 15	Seeded 15 & 16	Seeded 14 & 16
4R200	103.2%	103.6%	103.7%	103.5%	102.7%	104.3%	103.5%	98.2%	95.5%	91.9%	95.7%	103.5%	99.6%	99.6%
54VR10								105.6%	111.3%	107.0%	107.3%			
54VR70								105.4%	104.5%	102.9%	103.4%			
6424R								100.1%	98.9%	99.9%	97.7%			
AmeriStand 415NT RR								98.4%	100.9%	96.4%	98.9%			
AmeriStand 545NT RR					100.4%	106.3%	103.2%							
DKA 40-51RR	98.2%	96.4%	97.5%	97.3%										
DKA 43-22 RR	103.2%	96.2%	97.9%	99.0%										
DKA44-16RR	100.0%	103.7%	101.6%	101.9%	101.8%	100.5%	101.2%	99.4%	99.0%	97.4%	100.6%	101.5%	100.9%	101.2%
FG R410A136*								101.4%	98.8%	105.9%	99.9%			
LG 5R300*					97.8%	96.0%	97.0%							
Integra 8444R								95.5%	89.6%	92.7%	95.1%			
Integra 8401RR					95.9%	90.6%	93.4%							
RR AphaTron 2XT								101.7%	103.0%	105.9%	102.7%			
RR501	98.5%	98.5%	103.0%	100.0%	101.3%	102.3%	101.8%	94.2%	98.5%	100.0%	98.8%	100.9%	100.3%	99.4%
WL 356HQ.RR	97.0%	101.5%	96.3%	98.4%										
Total Tons/Acre	9.71	11.15	9.96	30.82	11.40	10.12	21.52	10.20	10.20	7.30	28.10			
LSD (0.10)	NS	4.1%	2.8%	2.1%	NS	6.7%	4.8%	4.9%	7.8%	4.9%	4.6%			
CV(%)	3.9	3.3	2.3	2.1	4.3	5.5	3.9	4.1%	6.5%	4.1%	4.0%			

TABLE 4. FALL DORMANCY & PEST RESISTANCE RATINGS FOR ALFALFA VARIETIES IN THESE TRIALS*

Variety	Marketing	FD	WS	BW	VW	FW	AN	PRR	APH1	SAA	PA	BAA	SN	SRKN	NRKN	Salt	Tech.
54Q29	Pioneer	4		HR	HR	R	HR	HR	HR	R	HR		HR				C
54VR10	Pioneer	4		HR	HR	MR	HR	HR	HR	R	HR		R				R
54VR70	Pioneer	4		HR	HR	MR	HR	HR	HR	R	HR		R				R
55Q27	Pioneer	5		HR	HR	HR	HR	HR	HR	R	R		HR				C
55VR05	Pioneer	5		HR	HR	HR	HR	HR	HR	R	R		HR		HR		R
6424R	NEXGROW	4	2	HR	HR	HR	HR	HR	HR	MR	R		R				R
6427R	NEXGROW	4	1	HR	HR	HR	HR	HR	HR	MR	R		HR				R
AFX 429*	Alforex	3		HR	HR	HR	HR	HR	HR			R	R				C
AFX 457*	Alforex	4		HR	HR	HR	HR	HR	HR	R	HR		R			G	C
AFX 469*	Alforex	4		HR	HR	HR	HR	HR	HR				HR			G	C
AFX 579*	Alforex	5		HR	HR	HR	HR	HR	HR			R	HR			G	C
AmeriStand 415NT RR	America's Alf.	4		HR	HR	HR	HR	HR	HR		HR		HR		HR	G	R
Ameristand 427TQ	America's Alf.	4	1	HR	HR	HR	HR	HR	HR		R		HR			G	C
AmeriStand 427TQ	America's Alf.	4	1	HR	HR	HR	HR	HR	HR		R		HR			G	C
AmeriStand 445NT	America's Alf.	4	2	HR	R	HR	HR	HR	R	HR	R		HR		HR		C
AmeriStand 545NT RR	America's Alf.	5		R	HR	R	HR	HR	HR	HR	HR		HR	HR			R
Camas	Eureka	4		HR	R	HR	HR	HR	HR	HR	R		HR		HR		C
DG 417RR	Nutrien Ag S.	4	1	HR	HR	HR	HR	HR	HR		R		R				R
DG 5315	Nutrien Ag S.	5		HR	HR	HR	HR	HR	HR		HR		HR				C
DKA40-16	DeKalb	4	1	HR	HR	HR	HR	HR	HR	R	R		HR			G	C
DKA40-51RR	DeKalb	4	1	HR	HR	HR	HR	HR	HR	R			R				R
DKA43-22RR	DeKalb	4	2	HR	HR	HR	HR	HR	HR				HR		R		R
DKA43-22RR	DeKalb	4	2	HR	HR	HR	HR	HR	HR				HR		R		R
DKA44-16RR	DeKalb	4	2	HR	HR	HR	HR	HR	HR	R	R		R			G	R
DKA50-17	DeKalb	5	1	HR	HR	HR	HR	HR	HR		HR		R				C
FSG 426	Farm Science	4	2	HR	HR	HR	HR	HR	HR	MR	HR						C
Grandstand II	Dyna-Gro	4	2	HR	HR	HR	HR	HR	HR		R		HR				C
Hi-Gest 360	Alforex	3		HR	HR	HR	HR	HR	HR			R				G	C
Hi-Gest 660	Alforex	6		R	MR	HR	HR	R				R				G	C
HybriForce-3400	Dairyland	4	2	HR	HR	HR	HR	HR	HR		R		HR	R	HR		H
Integra 8420	Wilbur-Ellis	4		HR	HR	HR	HR	HR	HR	HR	R		HR		HR		C

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Variety	Marketing	FD	WS	BW	VW	FW	AN	PRR	APH1	SAA	PA	BAA	SN	SRKN	NRKN	Salt	Tech.
Integra 8420	Wilbur-Ellis	4		HR	HR	HR	HR	HR	HR	HR	R		HR		HR		C
Integra 8444R	Wilbur-Ellis	4		R	HR	HR	HR	HR	R	HR			HR		R	G/F	R
LG 4R300	LG Seeds	4		HR	HR	HR	HR	HR	HR	HR	HR		HR				R
LG 5R300	LG Seeds	5		HR	HR	HR	HR	HR	HR	HR	HR		HR				R
Magnitude	Allied	4	2	HR	HR	HR	HR	HR	HR	R	R		HR			G	C
Magnum 8	Corteva	4		HR	HR	HR	HR	HR	HR	R	MR	R	R				C
PGI 529	Alforex	5	1	HR	R	HR	HR	HR	HR	MR	R	MR					C
PGI 557	Alforex	5	2	HR	HR	HR	HR	HR	HR		R	R	HR		HR		C
Quail	Blue River Hyb.	5		HR	HR	HR	HR	HR	HR		R	MR	HR		R		C
Rebound 6XT	Croplan	4	1	HR	HR	HR	HR	HR	HR	R	HR						C
RR AphaTron 2XT	Croplan	4	2	HR	HR	HR	HR	HR	HR		R		R				R
RR501	Bayer	5	2	HR		HR	HR	HR	HR		HR		HR			G/F	R
RRALF 4R200	Eureka	4	2	HR	HR	HR	HR	HR	HR	MR			HR		R		R
SGS 47M	J.R. Simplot	4	2	HR	HR	HR	HR	HR	HR		R		R				C
Slingshot	Brett Young	5	2	R	HR	HR	HR	HR	HR	HR	HR		HR		HR		C
SW 4107	S & W	4		HR	HR	HR	HR	HR	HR	MR	R		R				C
SW 4328	S & W	5		R	R	HR	HR	HR		R	HR		R	R			C
SW 5210	S & W	5		HR	HR	HR	HR	HR	HR	R	HR		HR				C
SW5213	S & W	5		HR	HR	HR	HR	HR	HR	R	HR		HR				C
Vernal	Public	2		R	S	MR	S	S	S				SN		MR		C
Vernema	Public	4		MR	MR		LR	LR		MR			HR				C
WL 349HQ	W-L Research	4	2	HR	HR	HR	HR	HR	HR		HR						C
WL 356HQ.RR	W-L Research	4	1	HR	HR	HR	HR	HR	HR	MR	R		HR			G	R
WL 365HQ	W-L Research	5	1	HR	HR	HR	HR	HR	HR	HR	HR		R				C

FD Fall Dormancy
WS Winter Survival
BW Bacterial Wilt
VW Verticillium Wilt

FW Fusarium Wilt
AN Anthracnose Race 1
PRR Phytophthora Root Rot

SAA Spotted Alfalfa Aphid
PA Pea Aphid
BAA Blue Alfalfa Aphid
SN Stem Nematode

APH¹ Aphanomyces Race 1
SRKN Southern Root Knot Nematode
NRKN Northern Root Knot Nematode
Salt Tol.- G=germination F=forage prod.

*NAFA's "Winter Survival, Fall Dormancy & Pest Resistance Ratings for Alfalfa Varieties - 2020 Edition and previous editions". "For a more complete copy of the NAFA document visit www.alfalfa.org/varietyLeaflet.php." Blanks mean adequate testing has not yet occurred. Only data from publications were used.

TABLE 5. THREE-YEAR FORAGE YIELD – 2016 ALFALFA VARIETY TRIAL, OTHELLO, ADAMS COUNTY, WA. FORAGE YIELD (TON DM/A)

Planted August 9, 2016		Fall	2017		2018		2019 Harvests						2017-2019		2019 Fall	
		Dorm.	Total	Total	11-Oct	Total	20-May	17-Jun	15-Jul	12-Aug	11-Sep	Total	Total	Total	Total	19-Sep
Company	Entry	Rating	Tons/a	% Mean	Cut 5	Tons/a	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% Mean	Tons/a	% Mean	% Stand
Alforex	PGI 529* (CW 085028)	5	10.88	108.2	11.98	112.00	3.49	2.81	2.07	1.79	1.17	11.32	112.6	34.2	110.9	96.5
Alforex	AFX 469* (CW 105006)	4	10.54	104.8	11.06	103.39	3.52	2.79	2.26	2.06	1.39	12.03	119.6	33.6	109.1	97.3
WL	WL 365HQ	5	10.68	106.2	11.16	104.31	3.31	2.89	2.20	1.93	1.30	11.63	115.6	33.5	108.6	95.7
Alforex	AFX 579* (CW 105023)	5	9.96	99.0	11.57	108.17	3.35	2.60	2.34	2.00	1.40	11.69	116.2	33.2	107.8	95.5
Pioneer	54Q29	4	10.53	104.7	11.35	106.16	3.61	2.39	1.90	1.68	1.13	10.71	106.5	32.6	105.8	98.1
Alforex	HG 4001* (CW 104015)	4	10.08	100.2	11.78	110.18	3.28	2.71	1.93	1.69	1.12	10.71	106.5	32.6	105.7	98.2
Alforex	4H400* (CW 054004)	4	10.57	105.1	11.76	109.92	3.41	2.39	1.69	1.61	1.10	10.21	101.5	32.5	105.6	97.5
Dyna-Gro	DG5315	5	10.64	105.8	11.06	103.43	3.42	2.64	1.94	1.64	1.14	10.78	107.2	32.5	105.4	95.7
Croplan	Rebound 6XT	4	10.09	100.3	10.75	100.50	3.60	2.53	2.04	1.91	1.29	11.36	112.9	32.2	104.5	95.4
Alforex	HybriForce-4400* (msSunstra-144110)	4	10.42	103.6	11.27	105.33	3.47	2.38	1.66	1.70	1.02	10.23	101.7	31.9	103.6	98.7
Alforex	PGI 557* (CW 055023)	5	9.95	99.0	11.39	106.53	3.25	2.50	1.88	1.69	1.10	10.43	103.7	31.8	103.1	98.3
Alforex	HybriForce-3420/Wet* (msSunstra-144109)	4	10.55	104.9	11.16	104.36	3.39	2.38	1.70	1.57	1.01	10.06	100.0	31.8	103.1	98.8
Alforex	AFX 429* (CW 103012)	4	10.44	103.8	10.67	99.76	3.34	2.46	1.96	1.74	1.13	10.63	105.7	31.7	103.0	96.1
S&W Seed Co	SW5213	5	10.39	103.3	10.85	101.49	3.41	2.36	1.73	1.58	1.08	10.17	101.1	31.4	102.0	98.1
Alforex	DS1168*	6	10.04	99.8	10.56	98.77	3.56	2.35	1.81	1.77	1.20	10.69	106.3	31.3	101.6	97.9
S&W Seed Co	SW5210	5	10.31	102.5	10.50	98.21	3.52	2.30	1.67	1.66	1.11	10.27	102.1	31.1	100.9	98.6
America's Alfalfa	427TQ	4	9.74	96.9	10.61	99.24	3.46	2.37	2.00	1.76	1.12	10.71	106.5	31.1	100.8	97.9
Alforex	Check 2*	3	10.20	101.4	11.15	104.26	3.13	2.35	1.68	1.52	0.94	9.62	95.7	31.0	100.5	97.6
Alforex	HibriForce-3400* (msSunstra-803)	4	10.18	101.2	10.56	98.71	3.50	2.14	1.63	1.66	1.05	9.98	99.3	30.7	99.7	97.9
Alforex	Hi-Gest 360* (CW 103009)	3	10.02	99.7	10.98	102.69	3.20	2.20	1.61	1.58	1.03	9.61	95.6	30.6	99.4	96.9
Alforex	CW 105021*	4	9.54	94.8	11.00	102.81	3.33	2.37	1.80	1.55	0.94	9.99	99.3	30.5	99.1	98.5
Alforex	HybriForce-3430* (msSunstra-143147)	4	10.52	104.6	10.44	97.57	3.21	2.14	1.60	1.52	0.93	9.40	93.5	30.4	98.5	98.0

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		Fall	2017		2018		2019 Harvests						2017-2019		2019 Fall	
		Dorm.	Total	Total	11-Oct	Total	20-May	17-Jun	15-Jul	12-Aug	11-Sep	Total	Total	Total	Total	19-Sep
Company	Entry	Rating	Tons/a	% Mean	Cut 5	Tons/a	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% Mean	Tons/a	% Mean	% Stand
Blue River Hybrids	Mallard*	5	10.31	102.5	10.54	98.53	3.08	2.14	1.53	1.47	0.99	9.21	91.6	30.1	97.6	97.6
Alforex	CW 093009*	3	9.59	95.3	10.65	99.60	3.10	2.27	1.63	1.66	1.05	9.71	96.5	29.9	97.2	98.1
Alforex	msSunstra-143146*	3	9.88	98.3	10.60	99.15	3.28	1.98	1.61	1.55	0.96	9.38	93.3	29.9	96.9	98.0
Precision Genetics	CB11007	4	9.68	96.3	10.43	97.51	3.10	2.05	1.63	1.74	1.19	9.72	96.7	29.8	96.8	97.3
America's Alfalfa	Ameristand 445NT	4	9.75	96.9	10.32	96.49	3.36	2.06	1.66	1.55	1.01	9.64	95.8	29.7	96.4	95.8
Wilbur Ellis	8420	4	9.89	98.3	10.20	95.36	2.95	2.21	1.66	1.53	0.95	9.30	92.5	29.4	95.4	96.4
Alforex	AFX 457* (CW A114030)	4	9.67	96.2	10.52	98.39	3.07	2.02	1.47	1.52	1.01	9.08	90.3	29.3	95.0	97.9
Alforex	Check 1*	5	9.88	98.3	9.81	91.76	3.29	2.09	1.57	1.51	0.94	9.41	93.5	29.1	94.5	96.2
Vernal	Vernal	2	8.47	84.2	8.16	76.26	2.57	1.40	1.03	1.10	0.67	6.77	67.3	23.4	75.9	95.8
Vernema	Vernema	4	8.44	83.9	7.40	69.15	2.61	1.39	1.19	1.30	0.88	7.37	73.3	23.2	75.3	95.4

Mean	4.2	10.06	100.0	10.70	100.00	3.29	2.30	1.75	1.64	1.07	10.06	100.0	30.8	100.0	97.2
CV %		5.3	5.3	6.7	6.2	7.5	7.3	8.7	9.0	13.8	6.2	6.2	4.0	4.0	1.7
LSD 10%		0.62	6.2	0.84	7.85	0.29	0.20	0.18	0.17	0.17	0.73	7.3	1.4	4.5	2.0

* Entered as Experimentals

TABLE 6. THREE-YEAR FORAGE YIELD - 2016 CONVENTIONAL ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA. FORAGE YIELD (TON DM/A)

Planted August 9, 2016		Fall	2017 Harvests		2018 Harvests		2019 Harvests						2017 - 2019		2019 Fall	
		Dorm.	Total	Total	Total	Total	8-May	5-Jun	3-Jul	1-Aug	3-Sep	Total	Total	Total	Total	12-Sep
Company	Entry	Rating	Tons/a	% Mean	Tons/a	% Mean	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% Mean	Tons/a	% Mean	Stand
S&W Seed Co	SW5213	5	11.3	110.6	22.4	109.8	2.12	2.08	1.57	1.54	1.49	8.80	113.5	31.2	110.8	89.3
S&W Seed Co	SW5210*	5	10.9	107.2	22.3	109.2	1.87	1.83	1.44	1.61	1.44	8.18	105.5	30.4	108.2	90.6
S&W Seed Co	54Q29	4	11.0	108.4	22.0	108.0	2.06	1.95	1.37	1.60	1.41	8.38	108.2	30.4	108.0	85.8
Croplan	Rebound 6XT	4	10.3	101.4	21.1	103.4	1.98	1.95	1.52	1.58	1.46	8.49	109.5	29.6	105.1	86.3
Wilbur Ellis	Integra 8420	4	10.2	99.8	21.1	103.5	1.86	1.66	1.41	1.52	1.50	7.95	102.6	29.1	103.3	83.9
CPS	DG5315	5	10.3	100.9	20.8	102.1	1.87	1.80	1.46	1.53	1.46	8.13	104.9	28.9	102.8	84.3
America's Alfalfa	Ameristand 445NT	4	10.3	100.7	20.8	101.8	1.80	1.72	1.36	1.55	1.52	7.95	102.6	28.7	102.0	88.6
America's Alfalfa	AmeriStand 427 TQ	4	10.1	98.7	20.0	98.1	2.06	2.01	1.41	1.58	1.44	8.49	109.5	28.5	101.3	87.3
Blue River Hybrids	Robin	5	9.9	97.4	19.7	96.9	1.72	1.52	1.18	1.35	1.33	7.11	91.7	26.9	95.5	82.4
Precision Genetics	CB11007	4	10.0	98.1	19.5	95.8	1.74	1.61	1.26	1.41	1.29	7.32	94.4	26.8	95.4	84.3
Legacy Seeds	L-504 HD	5	9.9	97.6	19.2	94.2	1.80	1.53	1.23	1.36	1.45	7.36	95.0	26.6	94.4	85.6
Precision Genetics	CB11009	4	9.7	94.9	18.9	92.5	1.93	1.54	1.12	1.35	1.37	7.31	94.3	26.2	93.0	88.0
Vernema	Vernema	4	9.5	93.0	18.8	92.1	1.79	1.16	1.05	1.36	1.27	6.62	85.3	25.4	90.2	75.6
Vernal	Vernal	2	8.4	82.5	16.6	81.6	1.62	0.85	0.70	1.25	1.39	5.82	75.0	22.4	79.8	76.1

Mean	4.2	10.2	100.0	10.2	100.0	1.88	1.67	1.30	1.48	1.42	7.27	100.0	27.7	100.0	4.3
CV %		6.3	6.3	6.6	6.6	8.3	11.3	11.5	8.6	9.9	7.4	7.4	4.8	4.8	4.7
LSD 10%		0.8	7.6	0.8	7.9	0.19	0.23	0.18	0.15	NS	0.64	8.8	1.6	5.8	4.8

* Entered as Experimentals

TABLE 7. THREE-YEAR FORAGE YIELD - 2016 ROUNDUP READY ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA. FORAGE YIELD (TON DM/A)

Planted August 9, 2016		Fall	2017 Harvests		2018 Harvests		2019 Harvests						2017 - 2019		2019 Fall	
		Dorm.	Total	Total	Total	Total	8-May	5-Jun	3-Jul	1-Aug	3-Sep	Total	Total	Total	Total	12-Sep
Company	Entry	Rating	Tons/a	% of Mean	Tons/a	% of Mean	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% of Mean	Tons/a	% Mean	Stand
S&W Seed Co	54VR10	4	10.1	105.6	12.0	111.3	1.85	2.02	1.64	1.63	1.54	8.68	107.0	30.1	107.3	85.8
DuPont Pioneer	54VR70	4	10.1	105.4	11.3	104.5	1.95	1.90	1.56	1.59	1.35	8.35	102.9	29.0	103.4	85.6
Croplan	RR AphaTron 2XT	4	9.7	101.7	11.1	103.0	1.90	2.01	1.63	1.62	1.44	8.60	105.9	28.9	102.7	90.2
Bayer	DKA44-16RR	4	9.5	99.4	10.7	99.0	1.83	1.74	1.40	1.54	1.41	7.91	97.4	28.3	100.6	86.3
FG	FG R410A136*	4	9.7	101.4	10.7	98.8	1.93	2.11	1.51	1.61	1.44	8.60	105.9	28.1	99.9	84.3
America's Alfalfa	AmeriStand 415NT RR	4	9.4	98.4	10.9	100.9	1.80	1.69	1.34	1.60	1.40	7.82	96.4	27.8	98.9	82.4
Bayer	RR501	5	9.0	94.2	10.6	98.5	1.80	1.79	1.49	1.62	1.40	8.11	100.0	27.7	98.8	90.6
Nexgrow	6424R	4	9.6	100.1	10.7	98.9	1.88	1.83	1.46	1.56	1.39	8.10	99.9	27.5	97.7	89.3
Eureka Seed	4R200	4	9.4	98.2	10.3	95.5	1.65	1.55	1.32	1.56	1.37	7.46	91.9	26.9	95.7	88.6
Wilbur Ellis	Integra 8444R	4	9.1	95.5	9.7	89.6	1.76	1.56	1.43	1.43	1.34	7.52	92.7	26.7	95.1	83.9

Mean	4.1	9.6	100.0	10.8	100.0	1.83	1.82	1.48	1.57	1.41	8.12	100.0	28.1	100.0	86.7
CV %		4.1	4.1	6.5	6.5	7.8	9.3	9.2	5.8	6.3	4.1	4.1	4.0	4.0	3.5
LSD 10%		0.5	4.9	0.8	7.8	NS	0.17	0.16	NS	NS	0.40	4.9	1.3	4.6	3.7

* Entered as Experimentals

TABLE 8. TWO-YEAR FORAGE YIELD – 2017 ALFALFA VARIETY TRIAL, OTHELLO, ADAMS COUNTY, WA. FORAGE YIELD (TON DM/A)

Planted August 10, 2017		Fall			2019 Harvests							2018-2019		2019 Fall
		Dorm.	Total	Total	20-May	17-Jun	15-Jul	12-Aug	11-Sep	Total	Total	2 Year Total		27-Sep
Company	Entry	Rating	Tons/a	% Mean	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% Mean	Tons/a	% Mean	Regrowth
Blue River Hybrids	Quail 5	5	11.16	103.1	3.58	2.56	2.54	2.24	1.47	12.39	117.3	23.6	110.1	5.0
S & W Seed Company	SW4107	4	11.87	109.6	3.38	2.81	2.17	1.97	1.19	11.53	109.1	23.4	109.4	4.5
Brett Young	59W205	5	11.48	106.0	3.29	2.66	2.41	2.19	1.32	11.88	112.4	23.4	109.2	5.0
Alforex Seeds	CW 104014	4	10.80	99.8	3.83	2.73	2.19	2.12	1.34	12.21	115.6	23.0	107.6	4.7
S & W Seed Company	SW5213	5	11.23	103.8	3.42	2.58	2.23	1.93	1.18	11.34	107.3	22.6	105.5	4.5
America's Alfalfa	AmeriStand 318TQ	3	11.32	104.6	3.77	2.48	2.03	1.80	1.04	11.12	105.3	22.4	104.9	4.3
Alforex Seeds	AFX 460* (CW A113005)	4	10.77	99.5	3.39	2.55	2.29	2.05	1.24	11.52	109.1	22.3	104.2	5.0
RR Check	RR Check	4	11.19	103.3	3.30	2.83	2.04	1.70	1.00	10.88	103.0	22.1	103.1	4.5
Conventional Check	Conventional Check	5	11.29	104.2	2.90	2.20	1.61	1.55	0.78	9.04	85.6	20.3	95.0	3.5
America's Alfalfa	AmeriStand 445NT	4	10.58	97.7	3.09	2.03	1.63	1.65	0.92	9.32	88.3	19.9	93.0	4.0
Public	Vernema	4	9.57	88.4	2.72	1.57	1.36	1.40	0.81	7.86	74.4	17.4	81.5	2.8
Public	Vernal	2	8.67	80.1	2.99	1.46	1.23	1.31	0.68	7.67	72.6	16.3	76.4	2.3
Mean		4.1	10.83	100.0	3.31	2.37	1.98	1.82	1.08	10.56	100.0	21.4	100.0	4.2
CV %			4.6	4.6	6.0	6.9	9.7	7.1	9.9	4.7	4.7	4.0	4.0	12.0
LSD 10%			0.60	5.5	0.24	0.19	0.23	0.16	0.13	0.60	5.7	1.0	4.7	0.6

* Entered as Experimentals

TABLE 9. TWO-YEAR FORAGE YIELD – 2017 CONVENTIONAL ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA. FORAGE YIELD (TON DM/A)

Planted August 9, 2017		Fall	2018		2019 Harvests							2018-2019		Regrowth
		Dorm.	Total	Total	8-May	5-Jun	3-Jul	1-Aug	3-Sep	Total	Total	2 Year Yield		Rating
Company	Entry	Rating	Tons/a	% Mean	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% Mean	Tons/a	% Mean	17-Sep
Bayer	DKA50-17	5	13.34	106.6	2.73	2.26	1.62	1.66	1.56	9.83	105.0	23.2	105.9	3.5
S & W Seed Company	SW5213	5	13.05	104.3	2.41	2.41	1.90	1.77	1.50	10.00	106.8	23.1	105.4	5.0
DuPont Pioneer	54Q29	4	13.17	105.2	2.61	2.50	1.55	1.64	1.57	9.88	105.5	23.0	105.3	4.0
Brett Young	Slingshot (59W205)	5	12.47	99.6	2.61	2.31	1.67	1.68	1.60	9.88	105.5	22.3	102.1	5.0
Bayer	DKA44-18	4	12.88	102.9	2.47	2.14	1.49	1.56	1.35	9.01	96.2	21.9	100.0	4.0
S & W Seed Company	SW4107	4	12.56	100.3	2.32	2.27	1.67	1.64	1.42	9.32	99.5	21.9	100.0	4.5
LG Seeds	Camas	5	12.12	96.9	2.37	2.38	1.64	1.59	1.54	9.52	101.7	21.6	98.9	5.0
Vernal	Vernal	2	10.54	84.2	2.47	1.50	0.99	1.31	1.20	7.48	79.8	18.0	82.3	2.0

Mean	4.3	12.52	100.0	2.50	2.22	1.57	1.61	1.47	9.36	100.0	21.9	100.0	4.1
CV %		3.3	3.3	8.0	8.5	8.8	7.1	12.1	5.7	5.7	5.5	5.5	10.2
LSD 10%		0.50	4.0	0.24	0.22	0.17	0.14	NS	0.65	6.9	1.5	6.9	0.5

TABLE 10. TWO-YEAR FORAGE YIELD – 2016 ROUNDUP READY ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA. FORAGE YIELD (TON DM/A)

Planted August 9, 2017		Fall	2018 Harvests		2019 Harvests						2017-2018		Regrowth	
		Dorm.	Total	Total	8-May	5-Jun	3-Jul	1-Aug	3-Sep		Total	Total	2 Year Yields	Rating
Company	Entry	Rating	Tons/a	% of Mean	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% of Mean	Tons/a	% of Mean	17-Sep
NEXGROW	6427R	4	13.06	103.8	2.29	2.35	1.89	1.85	1.46	9.83	100.68	22.89	102.41	5.0
LG Seeds	5R300	5	12.48	99.1	2.54	2.43	1.93	1.87	1.62	10.40	106.53	22.88	102.35	4.0
Bayer	DKA43-18RR	4	12.71	101.0	2.58	2.34	1.87	1.82	1.52	10.13	103.77	22.84	102.18	3.5
LG Seeds	4R300	4	12.49	99.2	2.61	2.22	1.85	1.83	1.52	10.03	102.74	22.52	100.76	5.0
Pioneer	54VR70	4	12.99	103.2	2.25	2.24	1.77	1.62	1.36	9.23	94.58	22.23	99.43	4.0
Bayer	DKA50-20RR	5	12.45	98.9	2.57	2.20	1.73	1.69	1.45	9.64	98.80	22.09	98.84	5.0
Bayer	DKA44-16RR	4	12.27	97.4	2.36	2.41	1.77	1.63	1.39	9.56	97.98	21.83	97.66	4.5
Nutrien Ag S.	DG 417RR	4	12.27	97.5	2.19	2.17	1.82	1.70	1.39	9.27	94.92	21.54	96.35	2.0
Mean		4.25	12.59	100.0	2.42	2.29	1.83	1.75	1.46	9.76	100.00	22.35	100.00	4.1
CV %			3.29	3.29	5.7	6.5	6.0	4.6	4.7	2.9	2.9	2.2	2.2	6.3
LSD 10%			0.5	4.0	0.17	NS	NS	0.10	0.09	0.35	3.59	0.70	3.13	NS

**TABLE 11. ONE-YEAR FORAGE YIELD - 2018 ALFALFA VARIETY TRIAL, OTHELLO, ADAMS COUNTY, WA.
FORAGE YIELD (TON DM/A)**

Planted August 8, 2018		Fall	2019 Harvests							2019 Fall
		Dorm.	20-May	17-Jun	16-Jul	12-Aug	11-Sep	Total	Total	27-Sep
Company	Entry	Rating	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% Mean	Regrowth
Alforex Seeds	AFX 155025*	5	3.04	2.29	1.95	1.94	1.10	10.32	109.3	4.8
Nutrien Ag Solutions	DG5315	5	3.04	2.50	1.87	1.74	1.06	10.22	108.2	5.0
S&W Seed Company	SW5207	5	3.31	2.50	1.85	1.62	0.92	10.21	108.1	4.5
Alforex Seeds	CW A125023*	4	2.95	2.47	2.02	1.73	1.02	10.19	108.0	5.0
Brett Young	BYS 5028	5	3.00	2.29	1.90	1.74	1.00	9.94	105.3	5.0
S&W Seed Company	SW5213	5	3.21	2.29	1.69	1.61	0.97	9.76	103.4	4.0
Alforex Seeds	AFX 134014*	4	2.87	2.09	1.86	1.69	0.98	9.50	100.6	5.0
Nutrien Ag Solutions	Dyna-Gro Exp. #1	4	2.74	2.34	1.71	1.60	0.98	9.37	99.2	4.5
Blue River Hybrids	Skylark	4	3.26	2.27	1.57	1.43	0.82	9.35	99.1	4.0
Ameristand	427TQ	4	3.03	2.30	1.68	1.51	0.81	9.33	98.8	4.5
Blue River Hybrids	Swift	4	2.95	2.17	1.64	1.51	0.89	9.17	97.1	4.3
Alforex Seeds	Magnum 8	4	3.12	2.15	1.62	1.45	0.75	9.09	96.3	3.8
Ameristand	445NT	4	3.14	2.08	1.54	1.48	0.77	9.01	95.4	3.8
Conv. Industry	Check	4	3.03	2.13	1.56	1.41	0.70	8.82	93.4	4.8
Public Check	Vernal	2	3.09	1.62	1.06	1.11	0.47	7.36	78.0	2.0

Mean	4.2	3.05	2.23	1.70	1.57	0.88	9.44	100.0	4.3
CV %		8.0	4.5	5.7	4.8	7.5	3.9	3.9	10.2
LSD 10%		NS	0.12	0.12	0.09	0.08	0.44	4.7	0.5

* Entered as Experimentals

TABLE 12. ONE-YEAR FORAGE YIELD – 2018 CONVENTIONAL ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA. FORAGE YIELD (TON DM/A)

Planted August 9, 2016		Fall	2019 Harvests							2019 Fall
		Dorm.	8-May	5-Jun	3-Jul	1-Aug	3-Sep	Total	Total	17-Sep
Company	Entry	Rating	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% Mean	Regrowth
W-L Research	WL349HQ	4	2.69	2.25	2.02	1.96	1.85	10.77	106.4	5.0
Nutrien Ag Solutions	DG5315	5	2.76	2.19	1.92	2.06	1.73	10.65	105.3	4.8
Bayer	DeKalb 50-17	5	3.04	2.10	1.81	1.82	1.68	10.45	103.3	4.8
S&W Seed Company	SW5213	5	2.91	2.23	1.84	1.79	1.61	10.38	102.6	4.3
Nutrien Ag Solutions	Dyna-Gro Exp.#1	4	2.84	2.12	1.84	1.85	1.70	10.36	102.3	4.3
Brett Young	BYS 5028	5	2.77	2.12	1.85	1.88	1.63	10.25	101.3	5.0
S&W Seed Company	SW5207	5	2.89	2.08	1.76	1.85	1.59	10.16	100.4	4.3
Blue River Hybrids	Finch	5	2.94	2.00	1.76	1.83	1.62	10.15	100.3	4.8
Bayer	DeKalb 44-18	4	2.91	2.13	1.73	1.76	1.58	10.11	99.9	5.0
Blue River Hybrids	Robin	5	2.96	2.02	1.70	1.82	1.58	10.08	99.6	4.3
Bayer	DeKalb 40-16	4	2.79	2.02	1.83	1.79	1.61	10.05	99.3	4.5
Blue River Hybrids	Quail	5	2.78	2.04	1.82	1.74	1.62	9.99	98.7	4.0
DuPont Pioneer	54Q29	4	2.69	2.19	1.80	1.74	1.49	9.90	97.9	4.0
Conv. Check	Vernal	2	2.96	1.64	1.20	1.41	1.16	8.37	82.7	2.0

Mean	4.4	2.85	2.08	1.78	1.81	1.60	10.12	100.0	4.3
CV %		6.4	5.8	7.6	6.3	8.0	4.0	4.0	7.7
LSD 10%		NS	0.14	0.16	0.14	0.15	0.49	4.8	0.4

* Entered as Experimentals

TABLE 13. ONE-YEAR FORAGE YIELD - 2018 ROUNDUP READY ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA. FORAGE YIELD (TON DM/A)

Planted August 9, 2016		Fall	2018 Harvests							2019 Fall
		Dorm.	8-May	5-Jun	3-Jul	31-Jul	3-Sep	Total	Total	17-Sep
Company	Entry	Rating	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Tons/a	% of Mean	Regrowth
Bayer	DeKalb 44-16RR	4	2.77	2.22	1.90	1.92	1.55	10.37	102.0	5.0
Nutrien Ag S.	DG417RR	4	2.69	2.22	1.95	1.99	1.46	10.31	101.4	5.0
Allied Seed	438RR	4	2.90	2.13	1.83	1.84	1.55	10.26	100.9	5.0
Bayer	DeKalb 43-18RR	4	2.68	2.20	1.91	1.85	1.53	10.16	99.9	4.8
Bayer	DeKalb 40-21HVXRR	4	2.88	2.00	1.79	1.82	1.54	10.03	98.7	4.8
RR Check	DeKalb 43-22RR	4	2.72	2.15	1.81	1.75	1.45	9.87	97.1	4.8
Mean		4.0	2.77	2.15	1.86	1.86	1.51	10.17	100.0	4.9
CV %			6.5	3.1	6.1	5.3	4.6	3.0	3.0	7.7
LSD 10%			NS	0.08	NS	0.12	NS	NS	NS	NS

TABLE 14. FORAGE QUALITY CONSTITUANTS AND HAY VALUE PER TON - SECOND CUTTING 2017 ALFALFA VARIETY TRIAL, OTHELLO, ADAMS COUNTY, WA

Planted August 10, 2017			Protein Content	Amylase Neutral Deterg. Fiber (aNDF)	Ash Content	Fat Content	Lignin Content	Non-fibrous Carbohydrates (NFC)	Net Energy Lactation NEL (Method NRC 2001)	Neutral Deterg. Fiber Digestab. (NDFD 48.)	Total Value of Hay per Ton @ 12% Moist. ^{1,2,3}
Company	Entry	Rating	%	%	%	%	%	%	Mcal/lb	%	\$/ton
Public	Vernema	4	23.7	36.9	9.78	1.73	5.56	30.3	0.617	49.6	275
Alforex Seeds	CW 104014*	4	23.0	38.2	9.96	1.75	5.72	29.3	0.605	49.9	265
Public	Vernal	2	22.7	38.7	9.77	1.64	5.87	29.5	0.600	48.6	261
America's Alfalfa	AmeriStand 445NT	4	22.5	38.8	9.75	1.75	5.86	29.4	0.601	48.6	260
Alforex Seeds	AFX 460* (CW A113005)	4	22.5	39.4	10.29	1.71	5.84	28.4	0.591	48.3	256
America's Alfalfa	AmeriStand 318TQ	3	22.2	40.3	10.22	1.60	6.11	27.9	0.581	47.3	249
Blue River Hybrids	Quail 5	5	21.5	41.0	9.75	1.60	6.21	28.4	0.580	46.1	244
Brett Young	Slingshot (59W205*)	5	21.1	41.7	9.98	1.61	6.33	27.7	0.571	46.1	238
Mean		3.9	22.4	39.4	9.94	1.67	5.94	28.9	0.593	48.1	256
CV %			3.1	3.4	2.4	4.5	3.3	3.2	2.2	2.4	4.0
LSD 10%			0.9	1.6	0.30	0.09	0.24	1.1	0.016	1.4	12

* Entered as Experimentals

¹ Calculated at \$0.35/ lb of Metabolizable Protein; \$0.11/lb of Mcal of energy, \$0.07 lb of effective NDF and \$-0.08 lb for ineffective fiber (assuming aNDF is 90% effective and 10% ineffective fiber).

² Adjustment for fiber impact of milk production due to cows eating more or less ration due to fiber, \$5.00 increase or decrease of value of hay for every point below or above and aNDF 44%, respectively.

³ Total Value of Hay per Ton @ 12% Moisture (sum of protein, energy, fiber, & fiber adjustment)

TABLE 15. FORAGE QUALITY ESTIMATES RFV, RFQ, VALUE PER TON OF PROTEIN, ENERGY, FIBER, ADJUSTMENT FOR COW INTAKE AND TOTAL VALUE PER TON AS FED FROM SECOND CUTTING OF 2017 ALFALFA VARIETY TRIAL, OTHELLO, ADAMS COUNTY, WA

Planted August 10, 2017

Company	Entry	Rating	Relative Feed Value (RFV)	Relative Feed Quality (RFQ)	Value of Metabolizable Protein (@ 55% of C. Protein) per Ton1	Value of Energy (Mega-Calories) per Ton1	Value of NDF Fiber per Ton1	Adj. For Feed Intake per Ton2	Total Value of Hay per Ton @ 12% Moist. ^{1,2,3}
			Units	%	\$/ton	\$/ton	\$/ton	\$/ton	\$/ton
Public	Vernema	4	160	175	81	123	36	36	275
Alforex Seeds	CW 104014*	4	152	168	79	120	37	29	265
Public	Vernal	2	149	162	78	119	37	27	261
America's Alfalfa	AmeriStand 445NT	4	148	162	77	120	38	26	260
Alforex Seeds	AFX 460* (CW A113005)	4	146	156	77	118	38	23	256
America's Alfalfa	AmeriStand 318TQ	3	140	149	76	116	39	18	249
Blue River Hybrids	Quail 5	5	138	145	73	115	40	15	244
Brett Young	Slingshot (59W205*)	5	134	140	72	114	40	11	238

Mean	3.9	146	157	77	118	38	23	256
CV %		4.9	6.3	3.1	2.2	3.4	28.9	4.0
LSD 10%		9	12	3	3	2	8	12

* Entered as Experimentals

¹ Calculated at \$0.35/ lb of Metabolizable Protein; \$0.11/lb of Mcal of energy, \$0.07 lb of effective NDF and \$-0.08 lb for ineffective fiber (assuming aNDF is 90% effective and 10% ineffective fiber).

² Adjustment for fiber impact of milk production due to cows eating more or less ration due to fiber, \$5.00 increase or decrease of value of hay for every point below or above and aNDF 44%, respectively.

³ Total Value of Hay per Ton @ 12% Moisture (sum of protein, energy, fiber, & fiber adjustment)

TABLE 16. ALFALFA YIELD, VALUE PER TON OF PROTEIN, ENERGY, FIBER, ADJUSTMENT FOR COW INTAKE, TOTAL VALUE PER TON AND PER ACRE AS FED FROM OF 2017 TRIAL IN 2018 AND 2019 - ALFALFA VARIETY TRIAL, OTHELLO, ADAMS COUNTY, WA

Planted August 10, 2017			2nd Cut Yield (12% Moisture)	Value of Metabol. Protein (@ 55% of C. Protein) per Acre ¹	Value of Energy (Mega-Calories) per Acre ¹	Value of NDF Fiber per Acre ¹	Adjust. For feed intake per Acre ²	Nutrient Value of Hay (@ 12% Moisture) per Acre ³	Total Value of Hay per Ton @ 12% Moisture ³	Two Year Total Value of Hay per Ton @ 12% Moisture ^{3,4}	Two Year Avg. Nutrient Value of Hay (@ 12% Moisture) per Acre ^{3,4}
Company	Entry	Rating	Tons/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/ton	\$/ton	\$/acre
America's Alfalfa	AmeriStand 318TQ	3	2.82	214	326	110	52	702	249	245	1657
Brett Young	Slingshot (59W205*)	5	3.02	218	344	122	34	718	238	245	1649
Blue River Hybrids	Quail 5	5	2.91	214	337	116	44	711	244	247	1623
Alforex Seeds	CW 104014*	4	3.10	244	372	115	88	819	265	253	1612
Alforex Seeds	AFX 460* (CW A113005)	4	2.90	223	341	111	66	741	256	259	1603
America's Alfalfa	AmeriStand 445NT	4	2.31	178	276	87	60	601	260	253	1483
Public	Vernema	4	1.79	144	219	64	63	490	275	250	1071
Public	Vernal	2	1.66	129	199	62	44	434	261	246	1041

Mean	3.9	2.56	196	302	98	56	652	256	250	1467
CV %		5.9	5.7	5.5	7.4	28.3	6.0	4.0	2.3	7.0
LSD 10%		0.18	14	20	9	19	47	12	7	126

* Entered as Experimentals

¹ Calculated at \$0.35/ lb of Metabolizable Protein; \$0.11/lb of Mcal of energy, \$0.07 lb of effective NDF and \$-0.08 lb for ineffective fiber (assuming aNDF is 90% effective and 10% ineffective fiber).

² Adjustment for fiber impact of milk production due to cows eating more or less ration due to fiber, \$5.00 increase or decrease of value of hay for every point below or above and aNDF 44% respectively.

³ Total Value of Hay per Ton @ 12% Moisture (sum of protein, energy, fiber, & fiber adjustment)

⁴ Sum of first cutting in 2018 and second cutting 2019. In 2018 valued nutrients at \$0.438/ lb of Metabolizable Protein; \$0.099/lb of Mcal of energy, \$0.06 lb of effective NDF and \$-0.077 lb for ineffective fiber.

TABLE 17. FORAGE QUALITY CONSTITUANTS AND HAY VALUE PER TON - SECOND CUTTING 2017 CONVENTIONAL ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA

Planted August 9, 2017			Protein Content	Amylase Neutral Deterg. Fiber (aNDF)	Ash Content	Fat Content	Lignin Content	Non-fibrous Carbohydrates (NFC)	Net Energy Lactation NEL (Method NRC 2001)	Neutral Deterg. Fiber Digestab. (NDFD 48.)	Total Value of Hay per Ton @ 12% Moisture ¹
Company	Entry	Rating	%	%	%	%	%	%	Mcal/lb	%	\$/ton
Public	Vernal	2	22.0	39.8	9.64	1.78	5.89	28.9	0.596	49.9	254
Bayer	DKA50-17	5	21.7	39.7	9.92	1.79	5.90	29.1	0.592	47.4	252
LG Seeds	Camas	4	21.6	39.9	9.89	1.80	5.99	29.0	0.590	47.8	250
Bayer	DKA44-18	4	21.0	41.1	9.72	1.85	6.20	28.4	0.583	47.5	243
Brett Young	Slingshot (59W205)	5	20.4	42.0	9.66	1.68	6.35	28.2	0.572	46.4	235

Mean	4.0	21.4	40.5	9.77	1.78	6.07	28.7	0.587	47.8	247
CV %		4.2	3.5	2.5	5.0	4.2	3.4	2.2	2.8	4.4
LSD 10%		NS	NS	NS	NS	0.32	NS	NS	1.7	NS

* Entered as Experimentals

¹ Calculated at \$0.35/ lb of Metabolizable Protein; \$0.11/lb of Mcal of energy, \$0.07 lb of effective NDF and \$-0.08 lb for ineffective fiber (assuming aNDF is 90% effective and 10% ineffective fiber).

² Adjustment for fiber impact of milk production due to cows eating more or less ration due to fiber, \$5.00 increase or decrease of value of hay for every point below or above and aNDF 44%, respectively.

³ Total Value of Hay @ 12% Moisture (sum of protein, energy, fiber, & fiber adjustment)

TABLE 18. FORAGE QUALITY ESTIMATES RFV, RFQ, VALUE PER TON OF PROTEIN, ENERGY, FIBER, ADJUSTMENT FOR COW INTAKE AND TOTAL VALUE PER TON AS FED FROM SECOND CUTTING OF 2017 CONV. ALFALFA VARIETY TRIALS, PASCO, FRANKLIN COUNTY, WA

Planted August 9, 2017		Fall Dorm.	Relative Feed Value (RFV)	Relative Feed Quality (RFQ)	Value of Metabolizable Protein (@ 55% of C. Protein) per Ton ¹	Value of Energy (MegaCalories) per Ton ¹	Value of NDF Fiber per Ton ¹	Adj. For Feed Intake per Ton ²	Total Value of Hay per Ton @ 12% Moisture ³
Company	Entry	Rating	Units	%	\$/ton	\$/ton	\$/ton	\$/ton	\$/ton
Public	Vernal	2	145	160	75	119	39	21	254
Bayer	DKA50-17	5	144	154	74	118	39	21	252
LG Seeds	Camas	4	143	154	74	117	39	21	250
Bayer	DKA44-18	4	138	148	72	116	40	15	243
Brett Young	Slingshot (59W205)	5	133	141	70	114	41	10	235

Mean	4.0	141	151	73	117	39	17	247
CV %		5.0	6.6	4.3	2.2	3.5	40.5	4.4
LSD 10%		NS	NS	NS	NS	NS	NS	NS

* Entered as Experimentals

¹ Calculated at \$0.35/ lb of Metabolizable Protein; \$0.11/lb of Mcal of energy, \$0.07 lb of effective NDF and \$-0.08 lb for ineffective fiber (assuming aNDF is 90% effective and 10% ineffective fiber).

² Adjustment for fiber impact of milk production due to cows eating more or less ration due to fiber, \$5.00 increase or decrease of value of hay for every point below or above and aNDF 44%, respectively.

³ Total Value of Hay @ 12% Moisture (sum of protein, energy, fiber, & fiber adjustment)

TABLE 19. ALFALFA YIELD, VALUE PER TON OF PROTEIN, ENERGY, FIBER, ADJUSTMENT FOR COW INTAKE, TOTAL VALUE PER TON AND PER ACRE AS FED FROM SECOND CUTTING OF CONVENTIONAL 2017 ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA

Planted August 9, 2017			2nd Cut Dry Matter Yield	Value of Metabol. Protein (@ 55% of C. Protein) per Acre ¹	Value of Energy (MegaCal ories) per Acre ¹	Value of NDF Fiber per Acre ¹	Adjust. For feed intake per Acre ²	Nutrient Value of Hay (@ 12% Moisture) per Acre ³	Total Value of Hay per Ton @ 12% Moisture ³	Two Year Total Value of Hay per Ton @ 12% Moisture ^{3,4}	Two Year Avg. Nutrient Value of Hay (@ 12% Moisture) per Acre ^{3,4}
Company	Entry	Rating	Tons/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/ton	\$/ton	\$/acre
Bayer	DKA44-18	4	2.57	185	299	102	38	624	243	257	1524
Bayer	DKA50-17	5	2.44	180	287	94	51	612	252	268	1488
LG Seeds	Camas	4	2.71	199	318	105	56	677	250	270	1476
Brett Young	Slingshot (59W205)	5	2.62	184	299	107	26	616	235	259	1407
Public	Vernal	2	1.71	128	202	66	35	431	254	261	1175

Mean	4.0	2.41	175	281	95	41	592	247	1414	263
CV %		10.0	9.7	9.5	11.2	30.6	9.4	4.4	2.7	8.5
LSD 10%		0.30	21	34	13	16	NS	NS	9	152

* Entered as Experimentals

¹ Calculated at \$0.35/ lb of Metabolizable Protein; \$0.11/lb of Mcal of energy, \$0.07 lb of effective NDF and \$-0.08 lb for ineffective fiber (assuming aNDF is 90% effective and 10% ineffective fiber).

² Adjustment for fiber impact of milk production due to cows eating more or less ration due to fiber, \$5.00 increase or decrease of value of hay for every point below or above and aNDF 44%, respectively.

³ Total Value of Hay @ 12% Moisture (sum of protein, energy, fiber, & fiber adjustment)

⁴ Sum of first cutting in 2018 and second cutting 2019. In 2018 valued nutrients at \$0.438/ lb of Metabolizable Protein; \$0.099/lb of Mcal of energy, \$0.06 lb of effective NDF and \$-0.077 lb for ineffective fiber.

TABLE 20. FORAGE QUALITY CONSTITUANTS AND HAY VALUE PER TON – SECOND CUTTING 2017 ROUNDUP-READY ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA

Planted August 9, 2017			Protein Content	Ash Free Neutral Deterg. Fiber (aNDF)	Ash Content	Fat Content	Lignin Content	Non-fibrous Charbohydrates (NFC)	Net Energy Lactation NEL (Method NRC 2001)	Neutral Deterg. Fiber Digestab. (NDFD 48.)	Total Value of Hay per Ton @ 12% Moisture ¹
Company	Entry	Rating	%	%	%	%	%	%	%	%	\$/ton
LG Seeds	4R300	4	22.5	39.1	10.1	1.82	5.77	28.711	0.599	48.1	259
LG Seeds	5R300	5	22.1	39.5	10.1	1.75	5.86	28.826	0.593	48.5	254
Nutrien	DG 417RR	4	21.5	40.6	10.0	1.78	6.05	28.252	0.585	48.2	246
Bayer	DKA50-20RR	5	21.2	40.9	9.8	1.87	6.05	28.366	0.587	47.8	244
Bayer	DKA43-18RR	4	21.3	41.4	9.6	1.74	6.23	28.038	0.581	47.0	242
Mean		4.4	21.7	40.3	9.9	1.79	5.99	28.439	0.589	47.9	249
CV %			2.3	2.5	3.9	8.6	3.0	3.3	2.2	2.5	3.1
LSD 10%			0.6	1.3	NS	NS	0.23	NS	NS	NS	10

¹ Calculated at \$0.35/ lb of Metabolizable Protein; \$0.11/lb of Mcal of energy, \$0.07 lb of effective NDF and \$-0.08 lb for ineffective fiber (assuming aNDF is 90% effective and 10% ineffective fiber).

² Adjustment for fiber impact of milk production due to cows eating more or less ration due to fiber, \$5.00 increase or decrease of value of hay for every point below or above and aNDF 44%, respectively.

³ Total Value of Hay @ 12% Moisture (sum of protein, energy, fiber, & fiber adjustment)

TABLE 21. FORAGE QUALITY ESTIMATES RFV, RFQ, VALUE PER TON OF PROTEIN, ENERGY, FIBER, ADJUSTMENT FOR COW INTAKE AND TOTAL VALUE PER TON AS FED FROM SECOND CUTTING OF 2017 CONV. ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA

Planted August 9, 2017			Relative Feed Value (RFV)	Relative Feed Quality (RFQ)	Value of Metabolizable Protein (@ 55% of C. Protein) per Ton ¹	Value of Energy (MegaCalories) per Ton ¹	Value of NDF Fiber per Ton ¹	Adj. For Feed Intake per Ton ²	Total Value of Hay per Ton @ 12% Moisture ³
Company	Entry	Rating	Units	%	\$/ton	\$/ton	\$/ton	\$/ton	\$/ton
LG Seeds	4R300	4	148	158	77	119	38	24	259
LG Seeds	5R300	5	146	157	75	118	38	22	254
Nutrien	DG 417RR	4	140	151	74	116	39	17	246
Bayer	DKA50-20RR	5	139	150	72	117	40	15	244
Bayer	DKA43-18RR	4	137	145	73	116	40	13	242

Mean	4.4	142	152	74	117	39	18	249
CV %		3.3	5.4	2.3	2.2	2.5	27.7	3.1
LSD 10%		6	NS	2	NS	1	6	10

¹ Calculated at \$0.35/ lb of Metabolizable Protein; \$0.11/lb of Mcal of energy, \$0.07 lb of effective NDF and \$-0.08 lb for ineffective fiber (assuming aNDF is 90% effective and 10% ineffective fiber).

² Adjustment for fiber impact of milk production due to cows eating more or less ration due to fiber, \$5.00 increase or decrease of value of hay for every point below or above and aNDF 44%, respectively.

³ Total Value of Hay @ 12% Moisture (sum of protein, energy, fiber, & fiber adjustment)

TABLE 22. ALFALFA YIELD, VALUE PER TON OF PROTEIN, ENERGY, FIBER, ADJUSTMENT FOR COW INTAKE, TOTAL VALUE PER TON AND PER ACRE AS FED FROM SECOND CUTTING OF CONVENTIONAL 2017 ALFALFA VARIETY TRIAL, PASCO, FRANKLIN COUNTY, WA

Planted August 9, 2017			2nd Cut Dry Matter Yield	Value of Metabol. Protein (@ 55% of C. Protein) per Acre ¹	Value of Energy (Mega-Calories) per Acre ¹	Value of NDF Fiber per Acre ¹	Adjust. For feed intake per Acre ²	Nutrient Value of Hay (@ 12% Moisture) per Acre ³	Total Value of Hay per Ton @ 12% Moisture ³	Two Year Total Value of Hay per Ton @ 12% Moisture ^{3,4}	Two Year Avg. Nutrient Value of Hay (@ 12% Moisture) per Acre ^{3,4}	
Company	Entry	Rating	Tons/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/ton	\$/ton	\$/acre	
Nutrien	DG 417RR	4	2.84	209	331	112	48	701	246	272	1588	
LG Seeds	5R300	5	2.82	213	332	108	63	716	254	280	1574	
Bayer	DKA43-18RR	4	2.59	189	300	104	34	627	242	264	1558	
LG Seeds	4R300	4	2.42	186	288	92	59	626	259	282	1556	
Bayer	DKA50-20RR	5	2.55	185	298	101	38	623	244	269	1444	
Mean			4.4	2.64	197	310	103	49	659	249	274	1544
CV %				6.0	6.8	6.6	6.5	29.6	7.1	3.1	2.1	4.5
LSD 10%				0.20	17	26	8	18	59	10	7.2	88

¹ Calculated at \$0.35/ lb of Metabolizable Protein; \$0.11/lb of Mcal of energy, \$0.07 lb of effective NDF and \$-0.08 lb for ineffective fiber (assuming aNDF is 90% effective and 10% ineffective fiber)

² Adjustment for fiber impact of milk production due to cows eating more or less ration due to fiber, \$5.00 increase or decrease of value of hay for every point below or above and aNDF 44%, respectively.

³ Total Value of Hay @ 12% Moisture (sum of protein, energy, fiber, & fiber adjustment)

⁴ Sum of first cutting in 2018 and second cutting 2019. In 2018 valued nutrients at \$0.438/ lb of Metabolizable Protein; \$0.099/lb of Mcal of energy, \$0.06 lb of effective NDF and \$-0.077 lb for ineffective fiber.