

## ADOPT FINAL REPORT - Project #20130450

### Project Identification

1. **Project Title:** Demonstration of AC Yellowhead Persistence and Performance in Saskatchewan Forage Stands
  2. **Project Number:** 20130450
  3. **Producer Group Sponsoring the Project:** Saskatchewan Forage Council (SFC)
  4. **Project Location(s) and Co-operators:**
    - Smeaton Community Pasture, Smeaton, SK
    - David Blechinger, Rosetown, SK
    - Southwest Forage Association, Swift Current, SK
    - DU Touchwood Hills Conservation Ranch, near Lestock, SK
  5. **Project start and end dates:** May 2014 – December 1, 2016
  6. **Project contact person & contact details:**
    - Leanna Rousell – Saskatchewan Forage Council  
PO Box 308, Asquith, SK S0K 0J0  
p. 306.329.3116                      e. [office@saskforage.ca](mailto:office@saskforage.ca)
    - Laura Hoimyr – Project Manager  
p. 306.969.4616                      e. [ml.hoimyr2@yourlink.ca](mailto:ml.hoimyr2@yourlink.ca)
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### Objectives and Rationale

#### **7. Project Objectives**

AC Yellowhead alfalfa (*Medicago sativa* subsp. *falcata*) was developed at the Swift Current Research Centre of Agriculture and Agri-Food Canada (AAFC). AC Yellowhead is a yellow-flowering alfalfa with sickle shaped seed pods which is reported to have improved persistence under grazing and superior cold hardiness and winter survival as compared to standard purple-flowered alfalfa varieties. This variety was released in 2007 and seed is now commercially available in limited quantities.

The objective of this project is to provide a demonstration of AC Yellowhead alfalfa establishment, winter survival and persistence in forage stands in Saskatchewan. Yield and nutritional quality of this forage will also be assessed in comparison to more commonly used purple-flowered varieties.

#### **8. Project Rationale**

Research has shown that this new crop is well-adapted to the extreme winter conditions experienced in Saskatchewan. Improved winter survivability of alfalfa as well as improved persistence under grazing correlate to better forage crop establishment and lower costs associated with forage stand rejuvenation. Research has also shown AC Yellowhead to have 1-2% higher protein than check varieties of alfalfa,

making it an attractive feed source for livestock producers. Until 2012 there has been no commercial seed grower of AC Yellowhead. As this seed becomes commercially available, producers will be looking for information on how this new alfalfa variety performs in the field.

## **Methodology and Results**

### **9. Methodology:**

Three of the four sites were sown in 2014 including Smeaton, Rosetown and Swift Current. The Lestock site was inaccessible due to heavy rain in 2014 and was seeded in the spring of 2015.

Forage blends were sown in ten acre plots as side-by-side comparisons at each site. One plot per site consisted of a blend of AC Yellowhead alfalfa and a grass or grass-blend based on cooperator preference. The second plot at each site consisted of a blend of a purple-flowered alfalfa with the same grass or grass-blend used in the AC Yellowhead plot. Seeding rates and forage species and varieties at each site are listed below:

#### **Smeaton Site**

1. AC Yellowhead alfalfa (1 lb/ac) and Common #1 Meadow Brome (8 lbs/ac)
2. Common #1 alfalfa (1 lb/ac) and Common #1 Meadow Brome (8 lbs/ac)

#### **Rosetown Site**

1. AC Yellowhead alfalfa (4.4 lbs/ac), Carlton Smooth Brome (2.25 lbs/ac) and Barolex Tall Fescue (2.25 lbs/ac)
2. Rugged alfalfa (4.4 lbs/ac), Carlton Smooth Brome (2.25 lbs/ac) and Barolex Tall Fescue (2.25 lbs/ac)

#### **Swift Current Site**

1. AC Yellowhead alfalfa (2.5 lbs/ac) and AC Knowles Hybrid Brome (7 lbs/ac)
2. Runner alfalfa (3 lbs/ac) and AC Success Hybrid Brome (7 lbs/ac)

#### **Lestock Site**

1. AC Yellowhead alfalfa (3 lbs/ac) and Common #1 Meadow Brome (7 lbs/ac)
2. Common #1 alfalfa (3 lbs/ac) and Common #1 Meadow Brome (7 lbs/ac)

Due to varied establishment success in 2014, it was determined that the site supervisors would collect establishment data only (plant counts) and that yield and quality assessments would be performed in 2015. Seedling counts were performed using a quarter meter squared quadrat and selecting five random sites per plot. Establishment was measured at the Smeaton and Rosetown site, while at Swift Current no alfalfa plants were observed. Lestock site establishment data was collected in 2015.

Table 1 lists seeding, assessment and sampling dates for the AC Yellowhead Demonstration sites.

**Table 1. AC Yellowhead Demo Seeding and Assessment Dates**

Site	Seeding Date	Assessment Date(s)	Forage Quality Sample Date
Smeaton	August 5, 2014	October 23, 2014 July 2, 2015 July 25, 2016	October 16, 2015
Rosetown	June 2, 2014	September 2, 2014 July 2, 2015 November 14, 2016	July 2, 2015
Swift Current	June 26, 2014 (Yellowhead plot) July 2, 2014 (Purple alfalfa plot)	August 25, 2014	N/A
Lestock	July 5, 2015	September 27, 2015 June 24, 2016	June 24, 2016

## 10. Results

### Smeaton Community Pasture-Smeaton, SK

The Smeaton demonstration plots are located on former perennial pasture land (SE 7-53-19 W2) in the grey soil zone on sandy loam/sand soil. The site was prepared through the use of two tillage operations prior to seeding. Seed was broadcast with a rangeland seeder on August 5, 2014. The late seeding date was due to wet conditions earlier in the season.

The plots were comprised of AC Yellowhead alfalfa (1 lb/ac) and meadow brome (8 lbs/ac) compared to Common #1 alfalfa (1 lb/ac) and meadow brome (8 lbs/ac). A cover crop of oats was sown with the crop. Oats were pre-heading and green at time of first inspection and alfalfa seedlings were at the four-leaf stage and green.

Seedling counts were completed in 2014 and 2015 by the site supervisor and are recorded in Table 2, Appendix B. Although plant counts were slightly higher for Yellowhead alfalfa than the purple-blossom alfalfa in the 2014 assessment, by 2015 the purple blossom alfalfa had established somewhat more successfully than the Yellowhead. Seedlings established and yields were much lower at Smeaton site than at the other two successful sites, likely due to a number of factors during seeding and establishment.

Broadcasting the seed into a stand that had been cultivated but not fully terminated resulted in new plants having difficulty establishing. The late seeding date also likely contributed to difficulty with establishment. During the winter of 2014-2015, the stand was grazed heavily by a herd of elk, which may also have thinned the stand and reduced the chances of seedling survival. At the 2015 assessment date, the site supervisor noted that plants were at the bud stage and that plants were thin, mostly one-stemmed and short. It is possible that some of the alfalfa plants did not germinate until the spring of 2015. Plant counts were performed again in 2016 and the purple blossom alfalfa continued to show a slightly higher plant count than the Yellowhead alfalfa. Also note the Smeaton site is in a community pasture which was grazed in 2015 and 2016.

Alfalfa samples were collected and sent to the lab for forage quality analysis in September 2015. These samples were accidentally destroyed by the lab and the site supervisor collected new samples in October 2015. Forage quality is somewhat lower at Smeaton than at other sites due to the late collection date. Full results are included in Table 5, Appendix B. The purple blossom alfalfa performed better than AC Yellowhead in terms of feed quality when comparing crude protein, acid detergent fiber, total digestible nutrients and Mcal/kg digestible energy.

Alfalfa samples were collected, dried and weighed to measure yield on July 2, 2015. Yields at Smeaton were lower than at the other sites in year two, likely due to the number of factors during seeding and establishment mentioned above. For this reason, yield data was collected in 2016 as well. In year three, yields increased for both varieties and the Yellowhead alfalfa averaged 528 kilograms of dry matter per acre (kg DM/ac), while the purple-flowered alfalfa yielded 337 kg DM/ac. Yields for the Smeaton site are listed in Appendix B, Table 9. Yellowhead alfalfa yields were 60% of the purple blossom alfalfa yields at Smeaton in 2015 but 156% of the purple blossom alfalfa yields in 2016. Increased yield by Yellowhead alfalfa despite lower plant populations could indicate that the plants were leafier or denser and provided more plant material for harvest per plant than the purple blossom alfalfa at this site.

#### David Blechinger-Rosetown, SK

The Rosetown demonstration plots are located at NW-07-30-16-W3, in the dark brown soil zone on Regina clay loam soil. The plots were sown on June 2, 2014 with a John Deere double disc press drill and on August 22, 2014 a half bushel of oats was sown into the plots to produce a greenfeed crop, which was cut for hay in 2014. The site was prepared with a pre-seed burn off with glyphosate. This location was previously used for an annual crop of oats in 2012 and was summer fallowed in 2013. The alfalfa/brome forages in these plots were harvested for hay in both 2015 and 2016.

Plots were seeded with 4.4 lbs/acre of AC Yellowhead alfalfa or Rugged alfalfa, blended with 2.25 lbs/acre of both Carlton smooth brome and Barolex tall fescue.

On assessing the plots on September 2, 2014, the site supervisor noted that both varieties of alfalfa were well established and that plants appeared healthy and robust. The seedling counts are included in Table 3, Appendix B.

On July 2, 2015, samples were taken to assess yields of the two alfalfa types as well as nutritional quality. See Tables 6 and 10, both in Appendix B for forage quality analysis and yield, respectively. AC Yellowhead alfalfa performed better in terms of quality, yield and establishment as compared to the purple blossom alfalfa at the Rosetown site more so than at any other site. The Rosetown site Yellowhead yielded approximately 92% of the purple-flowered alfalfa. Forage quality was similar for AC Yellowhead as compared to the purple-flowered alfalfa. Yellowhead showed slightly higher crude protein value, while the purple-flowered variety was higher in TDN, energy and lower in fiber. Yellowhead was higher in calcium, phosphorus and magnesium, but only slightly.

Plant count data was collected in November 2016 and showed a slight increase in the number of Yellowhead alfalfa plants as compared to purple-flowered alfalfa on average. Based on hay yields for the demonstration site, the landowner calculated 2016 yields as 1425 lbs/acre for the Yellowhead and 1727 lbs/acre for the purple-flowered alfalfa. The Yellowhead alfalfa yielded approximately 82% of the purple-flowered alfalfa. The landowner observed that the Yellowhead alfalfa was approximately six inches shorter than the purple-flowered alfalfa during forage harvesting, but that the Yellowhead appeared denser.

#### Southwest Forage Association-Swift Current, SK

The AC Yellowhead demonstration plots on Southwest Forage Association land near Swift Current were planted to annual crops in the previous two years but had been under permanent cover with perennial forages for over ten years prior to 2012. The site is located in the brown soil zone on sandy loam soil. Seeding was completed by July 2, 2104 (Runner alfalfa and hybrid brome), with the AC Yellowhead alfalfa and hybrid brome plot seeded on June 26, 2014. The seeding implement used was an air drill with the forage mix in the granular inoculant tank.

Weed control included two applications of glyphosate prior to seeding. The forage blends consisted of 2.5 lbs/acre AC Yellowhead and 7 lbs/acre AC Knowles hybrid Brome in the first plot and 3 lbs/acre Runner alfalfa and 7 lbs/acre AC Success hybrid brome in the second plot. The lower seeding rate for AC Yellowhead alfalfa was due to the seed supplier having less seed available than was anticipated and providing only partial bags for each site.

The site supervisor assessed the site on August 25, 2014 and observed that no alfalfa plants had established at that time. The supervisor felt that as this site is on marginal land and the seeding date was later than anticipated due to availability of seed and equipment, it was unlikely that establishment would be successful in the first year of the project. He anticipated that emergence and establishment would take place in 2015. There was very little rain in the 2015 growing season and the alfalfa and brome did not establish that year. This was the final assessment for this site as it was concluded that establishment was unsuccessful.

#### Ducks Unlimited (DU) Touchwood Hills Conservation Ranch-Lestock, SK

Due to excessive moisture and heavy rainfall in 2014 the Lestock site was inaccessible and could not be seeded. The site was a former perennial forage site that had been cultivated previously and then left idle. Pre-seeding weed control was necessary in the spring of 2015. Clover, quack grass and annual weeds dominated the site. Seeding was completed on July 5, 2015 and establishment data was collected on September 27, 2015. The plots were under-seeded to oats, which was cut for greenfeed in 2015 and the forages were harvested as hay in 2016. At the Lestock site, the seedling counts of AC Yellowhead were higher than for the purple-flowered alfalfa. The purple blossom alfalfa appeared more vigorous, with taller plants than the yellow blossom alfalfa. Photos in Appendix A provide a side-by-side comparison of the two plots as well as a closer view comparing the leaf size of the yellow- and purple-flowered plants.

For the Lestock site, yield and nutritional data were assessed on June 24, 2016. Alfalfa weevils were observed in the stand therefore the producer wished to start cutting hay in late June. The site supervisor was able to visit the site to collect data just prior to alfalfa being cut, but did not complete plant counts prior to cutting and was unable to return to the site to gather this data due to time constraints. Weevil levels were below the threshold to require any further control. Feed test results are shown in Table 7, Appendix B and yield results in Table 11, Appendix B. AC Yellowhead yields were 66 percent of the purple-flowered alfalfa yields when measured in 2016.

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### **Extension/Promotion Activities**

- Signs placed at each site
- Rosetown site toured on pasture walk July 6, 2015, hosted by Eagle Creek Watershed Group. Approximately 10 producers in attendance.
- Saskatchewan Pasture Tour at Touchwood Hills Conservation Ranch August 7, 2014 discussed the project although it was not yet seeded. 65-70 people were in attendance.
- Article *SFC ADOPT AC Yellowhead Demonstration* published in the Saskatchewan Forage Council eNews in March 2015. Mailing list of over 450 readers.
- Final project results will be available on the SFC website and shares on Twitter and in SFC publications such as the *Forage and Livestock eNews* as well as in Saskatchewan Ministry of Agriculture communications through the site supervisors.

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### **11. Conclusions and Recommendations:**

AC Yellowhead alfalfa and purple-flowered alfalfa varieties were compared for yield, establishment success and nutritional quality. Upon visual observation of the plants, supervisors noted that the AC Yellowhead plants were leafy, and tended to be finer and shorter, with smaller leaves. It was observed that the AC Yellowhead tended to mature later than the purple-blossom varieties, which was to be expected.

Seedling counts showed varying success of AC Yellowhead establishment as compared to purple-flowered alfalfa. At the Lestock site, more AC Yellowhead alfalfa plants established, although they appeared to not be as large or as vigorous as the purple blossom alfalfa plants. At the other sites, more purple blossom alfalfa seedlings were observed in year two. At the Rosetown site in 2016 there was a slight increase in AC Yellowhead alfalfa plants as compared to the purple-flowered variety and at Smeaton in 2016 yield was slightly higher for AC Yellowhead than for the purple-flowered variety despite fewer plants counted. Further observation would be required to determine whether this data is significant in regards to improved persistence of the Yellowhead in a forage stand.

When comparing feed quality, forage tests indicated that the Yellowhead alfalfa had lower protein, higher fiber (NDF and ADF), lower total digestible nutrients (TDN), and lower digestible energy than the purple-flowered alfalfa on average. The only exception to this was at the Rosetown site, where crude protein was 0.12% higher in the Yellowhead alfalfa as compared to the purple-flowered alfalfa. This gives an indication that AC Yellowhead could provide slightly higher protein as was reported in past research, but it did not appear to occur consistently in this demonstration. TDN values varied significantly, likely due in part to the different dates that samples were collected as well as variations in growing conditions at the different sites. On average, the purple blossom alfalfa had 5% higher TDN than AC Yellowhead. The range of the difference was less than 1% at the Yorkton site, approximately 3% at Rosetown and over 12% in Smeaton. Although the Yellowhead alfalfa tended to mature later than the purple blossom alfalfa, in this case the later maturity did not translate to improved ability to maintain forage quality late into the season.

Purple blossom alfalfa produced higher yields than AC Yellowhead alfalfa at all three sites (Smeaton, Yorkton and Rosetown), with the exception of the Smeaton site in 2016 (year three). Comparing forage production in the year after establishment, AC Yellowhead alfalfa yields were 66% of purple-flowered alfalfa yields at Yorkton, 92% of purple-flowered alfalfa yields at Rosetown and 60% of purple-flowered alfalfa yields at Smeaton, or an overall average of approximately 73% of purple-flowered alfalfa yields at all sites. AC Yellowhead alfalfa production at the Smeaton site in year three was 156% of the purple-flowered yields. It would be interesting to observe the demonstration plots in future years to determine how AC Yellowhead alfalfa compares to standard purple-flowered varieties over the long-term. It is possible that despite the smaller leaves and lower plant heights, the AC Yellowhead alfalfa becomes a denser and leafier plant once successfully established.

It is unclear why the AC Yellowhead alfalfa performed better at the Rosetown site than at the other two sites. Further observation would be required to determine whether AC Yellowhead is better adapted to this region, or whether the growing conditions in 2014 to 2016 simply favoured the AC Yellowhead in the demonstration at this site.

Based on the averages from all sites, it appears that AC Yellowhead does not provide any significant advantage over more conventional purple-flowered varieties in terms of yield, quality or ease of establishment. There was no indication that AC Yellowhead had better winter survival than the purple blossom alfalfa, and further observation would be required to determine whether AC Yellowhead displays

greater persistence under grazing than purple blossom alfalfa, as this project was only carried out over three growing seasons.

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## **Supporting Information**

### **12. Acknowledgements**

The Ministry's support for the project was acknowledged on signage displayed at each site and will be included on all upcoming communications. Industry/co-operator support has also been noted all project site signage and will be included in all upcoming communications.

### **13. Appendices**

Appendix A –photos

Appendix B – tables

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### **14. Abstract**

AC Yellowhead alfalfa (*Medicago sativa* subsp. *falcata*) was developed at the Swift Current Research Centre of Agriculture and Agri-Food Canada (AAFC) in Swift Current, SK. AC Yellowhead is a yellow-flowering alfalfa with sickle shaped seed pods which is reported to have improved persistence under grazing and superior cold hardiness and winter survival as compared to standard purple-flowered alfalfa varieties. This project demonstrated establishment success, yield, and nutritional quality of AC Yellowhead alfalfa compared to purple blossom alfalfa at four sites in Saskatchewan. Seedling establishment counts showed varying success of AC Yellowhead as compared to purple-flowered alfalfa, with most sites reporting fewer Yellowhead plants than purple-flowered varieties. Yield and nutritional quality were generally lower for Yellowhead alfalfa than for purple-flowered varieties. This project was highlighted at two field days and in an article for the Forage and Livestock eNews. Final results will be shared through the Saskatchewan Forage Council website and on social media. Further research and additional years of observing these demonstration plots would be useful to compare the ultimate success and persistence of this variety.

**Appendix A-Site Photos**



October 23, 2014  
Smeaton Site plant counts showed alfalfa  
seedlings in early stages of growth and  
still green



September 3, 2014  
Sample picture of Yellowhead Alfalfa plots  
Rosetown Site on first assessment date



June 24, 2016  
Yellowhead plot (left)  
compared to purple-  
flowered alfalfa plot at  
Yorkton site.



June 24, 2016  
Comparison of Yellowhead  
leaves (left) to purple-  
flowered alfalfa leaves (right)  
at Yorkton site

Appendix B – Tables

*Seedling Establishment Tables*

**Table 2. AC Yellowhead Demonstration Smeaton Site Seedling Counts**

<b>Sample Number</b>	<b>Yellowhead alfalfa seedling counts</b>	<b>Purple-flowered alfalfa seedling counts</b>
<i>October 23, 2014 Assessment</i>		
Quadrat 1	10	3
Quadrat 2	5	7
Quadrat 3	3	5
Quadrat 4	6	6
Quadrat 5	4	5
<b>Average 2014 Seedling Count</b>	<b>5.6</b>	<b>5.2</b>
<i>July 2, 2015 Assessment</i>		
<b>Quadrat 1</b>	2	5
<b>Quadrat 2</b>	3	6
<b>Quadrat 3</b>	4	5
<b>Quadrat 4</b>	6	10
<b>Quadrat 5</b>	3	4
<b>Average 2015 Seedling Count</b>	<b>3.6</b>	<b>6</b>

**Table 2 (continued). AC Yellowhead Demonstration Smeaton Site Seedling Counts**

<b>Sample Number</b>	<b>Yellowhead alfalfa seedling counts</b>	<b>Purple-flowered alfalfa seedling counts</b>
<i>July 25, 2016 Assessment</i>		
<b>Quadrat 1</b>	4	5
<b>Quadrat 2</b>	5	4
<b>Quadrat 3</b>	2	6
<b>Quadrat 4</b>	5	5
<b>Quadrat 5</b>	1	6
<b>Average 2016 Seedling Count</b>	<b>3.4</b>	<b>5.2</b>

**Table 3. AC Yellowhead Demonstration Rosetown Site Seedling Counts**

<b>Sample Number</b>	<b>Yellowhead alfalfa seedling counts</b>	<b>Purple-flowered alfalfa seedling counts</b>
<i>September 2, 2014</i>		
Quadrat 1	16	17
Quadrat 2	5	20
Quadrat 3	14	10
Quadrat 4	21	16
Quadrat 5	10	13
<b>Average Seedling Count</b>	<b>13.2</b>	<b>15.2</b>
<i>November 14, 2016</i>		
Quadrat 1	14	9
Quadrat 2	13	10
Quadrat 3	9	12
Quadrat 4	11	10
Quadrat 5	12	13
<b>Average Seedling Count</b>	<b>11.8</b>	<b>10.8</b>

**Table 4. AC Yellowhead Demonstration Lestock Site Seedling Counts**

Sample Number	Yellowhead alfalfa seedling counts	Purple-flowered alfalfa seedling counts
<i>September 27, 2015</i>		
Quadrat 1	33	31
Quadrat 2	26	14
Quadrat 3	21	15
Quadrat 4	26	20
Quadrat 5	25	26
<b>Average Seedling Count</b>	<b>26.2</b>	<b>21.2</b>

### *Forage Quality Tables*

**Table 5. AC Yellowhead Demonstration Smeaton site Feed Analysis October 16, 2015**

Analysis Variable* (Dry Matter Basis)	Yellowhead Alfalfa	Rugged Alfalfa
Crude Protein (%)	12.41	15.34
Calcium (%)	1.45	2.04
Phosphorus (%)	0.11	0.17
Magnesium (%)	0.30	0.28
Potassium (%)	0.99	1.64
Sodium (%)	0.02	0.02
NaCl (%) calculated	0.04	0.05
ADF (%)	42.39	30.61
TDN %	53.35	65.94
Metabolizable Energy (Mcal/kg)	1.95	2.42
NE Lactation (Mcal/kg)	1.19	1.50
Digestible Energy (Mcal/kg)	2.35	2.91
NE Maintenance (Mcal/kg)	1.10	1.54
NE Gain (Mcal/kg)	0.55	0.94

*\*Lab did not send results for NDF, non-fiber carbohydrate or relative feed value*

**Table 6. AC Yellowhead Demonstration Rosetown site Feed Analysis July 2, 2015**

<b>Analysis Variable (Dry Matter Basis)</b>	<b>Yellowhead Alfalfa</b>	<b>Rugged Alfalfa</b>
Crude Protein (%)	19.51	19.39
Calcium (%)	2.60	2.41
Phosphorus (%)	0.19	0.18
Magnesium (%)	0.56	0.55
Potassium (%)	2.05	2.07
Sodium (%)	0.01	0.02
NaCl (%) calculated	0.03	0.06
ADF (%)	30.11	29.70
NDF%	38.21	35.85
Non Fibre Carbohydrate	31.48	33.97
TDN %	66.47	66.90
Metabolizable Energy (Mcal/kg)	2.43	2.45
NE Lactation (Mcal/kg)	1.51	1.52
Digestible Energy (Mcal/kg)	2.93	2.95
NE Maintenance (Mcal/kg)	1.54	1.56
NE Gain (Mcal/kg)	0.95	0.96
Relative Feed Value	159	171

**Table 7. AC Yellowhead Demonstration Lestock site Feed Analysis June 24, 2016**

<b>Analysis Variable (Dry Matter Basis)</b>	<b>Yellowhead Alfalfa</b>	<b>Purple Blossom Alfalfa</b>
Crude Protein (%)	18.80	21.29
Calcium (%)	1.59	1.99
Phosphorus (%)	0.22	0.25
Magnesium (%)	0.32	0.42
Potassium (%)	2.75	3.20
Sodium (%)	0.01	0.03
NaCl (%) calculated	0.02	0.08
ADF (%)	35.85	33.13
NDF%	44.81	38.81
Non Fibre Carbohydrate	25.58	29.11
TDN %	60.33	63.24
Metabolizable Energy (Mcal/kg)	2.21	2.32
NE Lactation (Mcal/kg)	1.36	1.43
Digestible Energy (Mcal/kg)	2.66	2.79
NE Maintenance (Mcal/kg)	1.35	1.45
NE Gain (Mcal/kg)	0.77	0.86
Relative Feed Value	127	151

**Table 8. AC Yellowhead Demonstration Feed Analysis –Average of all sites\* 2015 and 2016**

<b>Analysis Variable (Dry Matter Basis)</b>	<b>Yellowhead Alfalfa</b>	<b>Purple Blossom Alfalfa</b>
Crude Protein (%)	16.91	18.67
Calcium (%)	1.88	2.15
Phosphorus (%)	0.17	0.20
Magnesium (%)	0.39	0.42
Potassium (%)	1.93	2.30
Sodium (%)	0.01	0.02
NaCl (%) calculated	0.03	0.06
ADF (%)	36.12	31.15
NDF%*	41.51	37.33
Non Fibre Carbohydrate*	28.53	31.54
TDN %	60.05	65.36
Metabolizable Energy (Mcal/kg)	2.20	2.40
NE Lactation (Mcal/kg)	1.35	1.48
Digestible Energy (Mcal/kg)	2.65	2.88
NE Maintenance (Mcal/kg)	1.33	1.52
NE Gain (Mcal/kg)	0.76	0.92
Relative Feed Value*	143	161

*\*NDF, non-fiber carbohydrate and relative feed value are averages of Yorkton and Rosetown sites only as this data was not reported by the lab for Smeaton site.*

## Yield Tables

**Table 9. AC Yellowhead Demonstration Smeaton Site Yield July 2, 2015 and July 25, 2016**

Quadrat #	Yellowhead Alfalfa		Purple Flowered Alfalfa	
	Grams of Dry Matter	Kg DM/acre	Grams of Dry Matter	Kg DM/acre
<i>July 2, 2015 Assessment</i>				
1	2	32.41	1	16.20
2	4	64.82	8	129.63
3	3	48.61	7	113.43
4	5	81.02	10	162.04
5	4	64.82	4	64.82
<b>Average</b>	<b>3.6</b>	<b>58.34</b>	<b>6</b>	<b>97.23</b>
<i>July 25, 2016 Assessment</i>				
1	62	1004.67	12	194.45
2	26	421.31	30	486.13
3	24	388.90	15	243.06
4	22	356.50	18	291.68
5	29	469.93	29	469.93
<b>Average</b>	<b>32.6</b>	<b>528.26</b>	<b>20.8</b>	<b>337.05</b>

**Table 10. AC Yellowhead Demonstration Rosetown Site Yield July 3, 2015**

Quadrat #	Yellowhead Alfalfa		Purple Flowered Alfalfa	
	Grams of Dry Matter	Kg DM/acre	Grams of Dry Matter	Kg DM/acre
1	39.5	640.5	39.5	640.5
2	52.9	857.4	56.1	908.3
3	54.2	878.9	67.9	1100.4
4	49.4	801.2	68.9	1116.2
5	70.0	1134.0	57.6	933.5
<b>Average</b>	<b>53.2</b>	<b>862.1</b>	<b>58.0</b>	<b>939.8</b>

**Table 11. AC Yellowhead Demonstration Lestock Site Yield June 24, 2016**

Quadrat #	Yellowhead Alfalfa		Purple Flowered Alfalfa	
	Grams of Dry Matter	Kg DM/acre	Grams of Dry Matter	Kg DM/acre
1	40	648.17	112	1814.88
2	58	939.85	110	1782.48
3	54	875.03	52	842.62
4	46	745.40	36	583.36
5	38	615.76	46	745.40
<b>Average</b>	<b>47.2</b>	<b>764.84</b>	<b>71.2</b>	<b>1153.75</b>