Saskatchewan Hay & Pasture Report

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Inside This Issue:

Note from the Saskatchewan Forage Council

Welcome to the first edition of the 2016 Hay and Pasture Report. This report is now in its 17th season, and will continue to provide current forage industry production and marketing information. This publication complements our monthly Forage and Livestock eNews, which keeps you current with news and updates from the forage industry in Saskatchewan. For detailed forage market information, visit the SFC website and read our January 2016 Forage Market Report.

This edition of the Report contains articles on grazing management, soil health, a Saskatchewan feed research project, energy-dense forages and the 2016 Hay Harvest Challenge. You'll also find forage market information and the Saskatchewan Agriculture Crop Report in this and every edition.

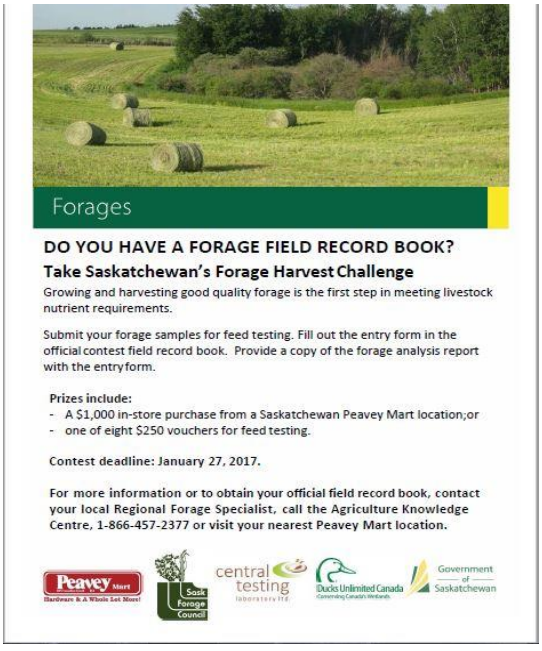
As always, we welcome your feedback and encourage anyone interested in being placed on our email distribution list to contact the SFC at office@saskforage.ca. You may also want to visit our website www.saskforage.ca for regular news and information related to the forage industry.

Saskatchewan Forage Harvest Challenge

The Harvest Challenge is back for 2016!

Growing and harvesting quality forage is the first step in meeting livestock nutrient requirements. The Sask Forage Harvest Challenge booklet is not only for record keeping, but is also full of forage production and harvest management information- great for a quick reference to often –asked forage questions!

To enter contest: submit your forage (hay and greenfeed) samples for feed testing. Fill out an entry form in the official contest record book. Provide a copy of the forage analysis report with the entry form. Prizes to be won include: One of eight $250 vouchers for feed testing or a grand prize of $1000 in-store purchase from a Saskatchewan Peavey Mart location.



For more information or to obtain your field record book, contact your local Regional Forage Specialist or the Saskatchewan Forage Council, call the Agricultural Knowledge Centre at 1-877-457-2377 or visit your nearest Peavey Mart location or click here to visit the Saskatchewan Agriculture website.

Saskatchewan Agriculture Crop Report

(For the period ending May 23, 2016)

Great strides were made this past week, as 81 per cent of the crop is now seeded, according to Saskatchewan Agriculture's weekly Crop Report. Warm and dry weather has allowed producers to remain well ahead of the five-year (2011-2015) seeding average of 59 per cent. Many producers have completed seeding operations and are now starting in-crop herbicide applications.

Seeding is most advanced in the southwest, where producers have 90 per cent of the crop seeded. Eighty-seven per cent of the crop is seeded in the southeast; 84 per cent in the northwest; 83 per cent in the west-central region; 75 per cent in the northeast; and 68 per cent in the east-central region.

Rainfall in the province ranged from trace amounts to several inches in the west-central region. Some areas will need rain in the coming weeks to help crops emerge and establish. Topsoil moisture conditions on cropland are rated as three per cent surplus, 83 per cent adequate, 13 per cent short and one per cent very short. Hay land and pasture topsoil moisture is rated as one per cent surplus, 72 per cent adequate, 20 per cent short and seven per cent very short.

The majority of emerged crops are either at or ahead of their normal developmental stages for this time of year. Overall, crops are in good condition, although there has been some damage caused by flea beetles, cutworms, strong winds, localized flooding and lack of moisture.

Pasture conditions are rated as seven per cent excellent, 57 per cent good, 26 per cent fair, nine per cent poor and one per cent very poor.

Producers are busy completing seeding operations and controlling pests.

Energy-dense Forages: An Opportunity for the Canadian Beef Production Model

Clayton Robins, Nuffield Scholar
Nuffield Canada Scholar Report

With Canada being well known internationally as a producer of high-quality forages one would expect that, logically, the production of forage-fed beef should be equally as successful. However, due to the short growing season, harsh winters and dominance of perennial forage as a feed source; consistently producing a quality forage-fed beef product has been a challenge. The greatest hurdle to the forage-fed beef enterprise lies in the difficulty in providing an adequate level of diet energy in a forage-fed beef production model, especially in the form of a low-cost forage of consistent feed value. Dietary energy is important in supporting several metabolic processes in ruminants, not the least of which involves the accumulation of body fat in various storage depots. High levels of dietary energy supply provided at key points

in a beef production model are critical for achieving acceptable levels of accumulation. Meeting these targeted levels of lipid accretion are necessary to attain desirable carcass grading standards and to supply a retail product that reflects beef consumer preferences. With respect to this discussion, and the intent of the topic of this study, the focus will be on the region of the Canadian Prairies in the Northern Great Plains of North America. This is the heart of beef production in Canada and the area that faces the both the greatest obstacles and opportunities to providing a low-cost, sustained supply of metabolizable energy to livestock using forages. This is not to say that the region is not capable of producing forages with significant levels of digestible energy; the difficulty lies in the length of time that forages traditionally grown on the Prairies can maintain those levels. At one of the earliest meetings in the course of this investigation I was struck by a comment from Dr. Monica Agnusdei from Balcarce, Argentina; who said: "Any forage has the potential to be an energy-dense forage." No truer statement could be conveyed, and forms the basis of the proposed grazing strategy deliberated in this report; that being the utilization of combinations of perennial and annual forage species, provided at appropriate plant stages and at strategic points in the beef production model.

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There are two real challenges in Canada with using perennial forages in forage-feeding models for growing and finishing classes of cattle in order to attain high levels of performance. The first is the protein-energy imbalance whereby Canadian forages typically supply digestible protein well in excess of the needs of almost every class of grazing livestock during the growing season; at the expense of other more desirable components in the plant. This challenge is echoed by many graziers around the world so it is not unique to the Canadian Prairie environment. The second is for the inherent need to manage these forages in a manner that allows them to store enough nutrient reserves to mitigate plant injury and/or mortality during severe winter conditions. This is accomplished by either extended periods of rest and/or limiting defoliation during the critical (acclimation) period in the 6-8 weeks prior to a killing frost. By providing for periods of rest and grazing these forages at advanced physiological stages, owing to the length of the rest periods, the digestibility of these forages is greatly diminished. While this management strategy is important for maintaining plant health it is a system best suited for mature animals and not feeder or finishing classes of cattle.

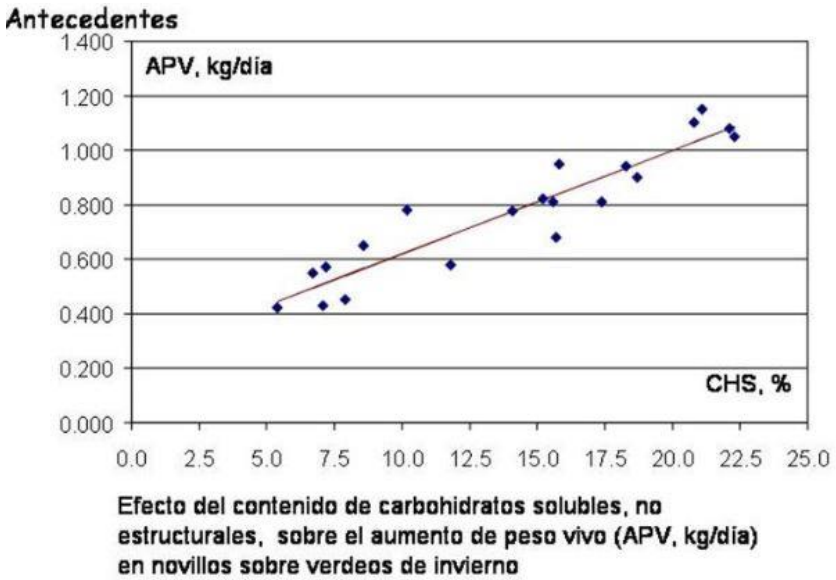
The challenges with incorporating annual forages into this system is that it is necessary to select species that are high-yielding and develop rapidly, owing to the high cost of establishment and the fact that the short growing season only allows for one crop per production cycle. Traditionally, cereals and corn are the crops of choice for this model. Optimal utilization of these species for both yield and quality usually results in mechanical harvesting and storage; in order to capture optimal forage quality and minimize grazing waste. An alternative to this practice, swath-grazing, became very popular across the Canadian Prairie region several years ago. This practice involves the regular production of the cereal crops, mechanical swathing or windrowing, and then leaving the material in the field to be strip-grazed using portable electric fence. There are several advantages to this technique that have been measured scientifically: a) up to $0.50/head/day or higher in reduced feeding costs; b) lower manure handling costs; c) greater nutrient retention in the field; and d)improvements in animal health. However, there is also a significant risk for deterioration of forage quality with material laying exposed to natural elements. Reductions in animal performance, increased forage waste and economic loss are the result when forage quality degrades.

Furthermore, the use of corn and cereals in the feedlot supply chain may come under pressure from two perspectives. Firstly, they may be perceived to be in

competition for human consumption as a dietary source of whole grain. This is a debate that will not be addressed in this discussion but is a matter of note to be considered. Secondly and more importantly is the impact on the soil, especially in the case of cereals. Recent research has demonstrated that even under the best soil management practices monoculture short-season crops like cereals are likely neutral at best in terms of sequestering carbon into the soil. Agriculture is at a period in time when the conversation truly needs to be about the regeneration of degraded and infertile soils, as well as about utilizing crop selection and management practices that create net soil carbon storage. Looking at the challenges that lie ahead, conversation about sustainability is not necessarily a sustainable approach, especially if net soil losses are still a risk with current crop production strategies.

Owing to the short growing season and climatic challenges faced by Canadian beef farmers striving to raise and market forage-fed beef, it is apparent that the incorporation of annual forages into a systems-based approach is key to the success of the model. Whether provided under grazing or as stored feed, during and outside the growing season, annual plants offer the best potential for an extended supply of digestible energy in cattle diets. Research and production efforts have been focused in this area in Canada, with some measure of success. However, forage-fed beef production still faces issues in the area s of carcass and eating quality, due to reduced marbling fat content and inconsistent texture as well as considerably longer periods of time on feed than concentrate-fed cattle in feedlot systems. These represent both logistic and economic impediments to the industry that must be overcome to achieve greater market share. In order to address some of these concerns and to better understand a successful production model a team of researchers and producers, myself included, travelled to Argentina in 2008 to study the entire forage-fed beef value chain. Annual forages comprised a significant component of the Argentine feeding strategy for cattle finishing. However, the approach to forage quality assessment was likely the biggest lesson learned. Graph 1 illustrates the relationship between water soluble carbohydrates (WSC), or simple sugars, and gain of beef cattle.

Graph 1. Effect of WSC concentration on steer average daily gain (ADG).Pordomingo, 2008



This single slide changed my perception of forages and immediately directed attention to an entirely new approach; that being how to produce and offer plants with Elevated levels of WSC to enhance performance of feeder and finishing classes of beef cattle. I have not had the heart to translate this slide into English owing to the profound effect that it had in coming to this realization. Therefore, to translate, the bottom axis represents plant WSC concentration (percent of DM or dry matter) of cereals being grazed as they advance in physiological maturity to the late milk and early dough stages of kernel development. The side axis represents live weight ADG (average daily gain) of finishing steers in kg/day. Clearly, this is a very impressive and compelling data set that demonstrates a well-correlated and quite linear relationship between the two measured parameters.

It was at this point that I now realize my Nuffield journey truly began.

To download the full Nuffield Scholar Report, click here.

To download Clayton Robins' presentation (power point format) at the 2015 Canadian Forage and Grasslands Association conference, or to view other presentations, visit the CFGA website and view the Conference Proceedings page.

STOCKING RATES KEY TO CLIMATE CHANGE ADJUSTMENT

By Jeff Melchior
Reprinted with permission from Canadian Cattlemen magazine, April 11, 2016

Low defoliation rates and leaving lots of litter are best for coping with weather variations from year to year.

Fast and hard? Slow and easy? And how many animals per acre?

Stocking and defoliation rates are a complex and even controversial issue, and depend a lot on the weather. Climate change could make them even more complex.

To get a better idea on how producers should respond, Edward Bork and a team from the University of Alberta recently completed a three-year research project looking at forage growth response to variation in summer rainfall, heat and grazing intensities across the Prairies. Although research is ongoing and may reveal new management practices in the future, Bork says the best practice right now is to utilize low to moderate stocking.

"You can't prevent risk but you can reduce it," says Bork. "Use the general recommendations associated with good management, particularly conservative stocking rates — certainly no higher than moderate — and leave plenty of litter to conserve soil moisture. In our study we had several different defoliation intensities and the heaviest one was always the worst in terms of forage production penalty. This is particularly important in drought years."

The study also helped clarify some other mysteries surrounding climate change. "For example, although a relatively small increase in temperature of 2 C only had a moderate impact on forage production, it's the likelihood of increasing water demands under warmer conditions accompanied by extended drought that presented the most risk. Warmer conditions can increase evaporation of soil moisture and reduce water use efficiency by plants, further jeopardizing forage production."

Bork notes that previous studies have shown as much as 60 per cent of production can be lost in arid prairie grasslands of Alberta with the removal of litter.

General Trends

Over the course of three growing seasons Bork and his colleagues studied the effects of climate change on native grassland, focusing on changes in grass, forb and total herbage production under controlled conditions at three locations in Alberta, Saskatchewan and Manitoba. The Alberta site was located 140 km southeast of Edmonton in a fescue grassland within the Parkland. The Saskatchewan site was a mixed-grass prairie 130 km south of Regina, while the Manitoba location was a moist grassland in the Parkland-Boreal transition 200 km northwest of Winnipeg.

However, heat itself had a relatively minor impact compared to decreased precipitation and clipping intensity, revealing as much as a 32 per cent loss in forage under high-intensity defoliation.

The researchers simulated temperature increases by situating plots in small fibreglass greenhouses which increased daytime temperatures during the growing season by 1 to 3 C. Shelters were used to decrease precipitation by 60 per cent. Various grazing regimes — heavy, light and none — were simulated by clipping forage annually at peak growth.

Increased heat played a role in decreasing richness, the number of species present and forage availability at all three sites.

However, heat itself had a relatively minor impact compared to decreased precipitation and clipping intensity, revealing as much as a 32 per cent loss in forage under high-intensity defoliation. Although the results varied by location, growing seasons and combinations of treatments, the general trends showed that reduced precipitation cut overall forage availability by 25 per cent and heating by eight per cent. Low-intensity clipping accounted for a 13 per cent loss of forage.

“Although there’s an effect with warming itself, it’s quite small in relation to the precipitation reduction,” says Bork. “But those go hand in hand, especially if you have a drop in precipitation during extended warm periods because more rainfall is needed to make up for the greater water loss due to evaporation and increased demand for water by stressed plants.”

Regional Variability

Responses to reduced precipitation varied markedly among the three locations tested. At the Saskatchewan site, for example, researchers saw little loss in forage due to reduced precipitation while the Manitoba and Alberta plots experienced a forage drop of 20 and 43 per cent respectively.

“While we thought the Saskatchewan site would go down the most in production due to its inherently arid environment, it did not, potentially because these grasslands are better adapted to extended periods of low moisture. Mixed-grass vegetation has up to 85 per cent of its biomass below ground as roots, which may render it less susceptible to drought. For the vegetation found there, it’s just another day at the office,” says Bork.

“Meanwhile, areas traditionally more reliant on moisture, such as in north-central Alberta and Manitoba, were more prone to production declines when the taps were turned off. Thus, the risk to livestock producers may be much higher there. Does that mean Saskatchewan is immune to climate change and drought? No. These studies were completed over a three-year period and if we were to continue on for several more years these systems may eventually change in response to repeated water stress.”

Another component of their study, which looks at root responses to warming and drought, is refining our understanding of the relationship between root growth and climate. Again, Bork emphasizes the importance of reduced stocking regimes.

"Heavy defoliation exasperates the effects of drier and warmer conditions because of changes in rooting patterns. As a result, producers who want to mitigate that risk by maintaining a healthy root system should use low to moderate stocking. Otherwise you put your grassland at greater susceptibility to drought and warming effects, with heightened forage loss."

Bork notes that any tendency among central Alberta producers to overstock their grasslands likely comes from a long history of relatively consistent weather patterns.

"Throughout the '70s and into the '90s the Parkland in north-central Alberta saw pretty stable production and rainfall throughout the growing season. In contrast, over the last decade and a half we've seen a sharp turnaround with half a dozen of the driest years on record. It's those producers who don't necessarily think about adjusting their stocking rates and fail to leave sufficient litter to conserve moisture during wild swings in moisture that end up paying the greatest price."

This article first appeared in the "Forage & Grassland Guide" in the March 2016 issue of Canadian Cattlemen.

To read the full article, click here.

"BIO-FORAGE FEED" RESEARCH PROGRAM UPDATE

Professor: Dr. Peiqiang Yu Ministry of Agriculture Strategic Research Chair in Feed R&D, Department of Animal and Poultry Science, College of Agriculture and Bioresources, University of Saskatchewan

Research Background and Motivation:
An alfalfa progeny was recently developed by transforming Lc and C1 genes which are known flavanoid path regulatory genes in Zea maize. Previously, Lc single gene transformed genotypes were developed and tested but with limited success. The intention was to promote protein binding anthocyanidin accumulation in alfalfa leaves and stems thus reducing extent and rate of protein degradation in the rumen. Further, there were previously reported evidences that (pro)anthocyanidin may reduce the methane production in the rumen.

Research Objective:
The objective of current study is to evaluate the effect of co-expression of Lc and C1 genes on (1) available protein, energy and feed milk values, and (2) methane gas production during fermentation by rumen microbes, in comparison with single gene transformed alfalfa and non-transgenic parent plants.

Research Methodology:
Alfalfa samples were collected from populations of single gene transformed (C1, Lc1 and Lc3), double gene transformed (Lc1C1 and Lc3C1), parental non-transgenic (NT) and commercial cultivar AC-Grazeland (ACGL) maintained in growth chambers at Saskatoon Research Centre, Agriculture and Agri-food Canada. Samples were analyzed according to AOAC methods. Energy and protein values were determined according to the NRC and CNCPS models. Fermentation gas were measured and collected from in vitro batch culture trial. Gas samples were analysed for methane using a gas

chromatograph.

Research Results and Discussion:
Rumen degradable protein was higher by 2% in double gene alfalfa comparing to single gene alfalfa, but no differences observed in digestible rumen undegradable protein. In comparison to single gene alfalfa, co-expression of Lc and C1 genes has increased net energy by 50 kcal for both lactation and growth and thereby increasing the feed milk value by 80 g of milk per kg of alfalfa dry matter. In double gene alfalfa, total gas production from tended to be lower than NT alfalfa while methane production is significantly lower (by 3.5 l per kg DM) than single gene alfalfa.

Conclusion:
In conclusion, C1 gene when co-expressed with Lc gene influences an increase in the feeding value and reduces the methane production during fermentation.

Other Project Information:
People are involved in this project:
Principal Investigator: Professor Dr. Peiqiang Yu1*
PhD student: R. G. Heendeniya1
Project Collaborators/Co-investigators: M. Y. Gruber2, Y Wang3, D. A. Christensen1, J. J. McKinnon1, B. Coulman4, Peiqiang Yu1*

1Department of Animal and Poultry Science, College of Agriculture and Bioresources, University of Saskatchewan, Canada
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3Lethbridge Research Center, Agriculture and Agri-Food Canada
4Department of Plant Science, College of Agriculture and Bioresources, University of Saskatchewan, Canada

MANAGEMENT OF INTENSIVE LIVESTOCK GRAZING

Saskatchewan Ministry of Agriculture

Intensive Grazing
Intensive grazing describes livestock and grass management practices that focus on

- Increased levels of manager involvement,
- Increased forage quality
- Increased meat production per unit area; and
- More uniform forage utilization

Managers practicing intensive grazing closely follow the interactions between plant, animal, soil and water. They determine where, when and what livestock graze, and control animal distribution and movement. They plan with these factors in mind, and this attention encourages positive attitudes toward the land.

Goal of range and pasture management
The goal of range and pasture management is to produce an optimum, sustained yield of livestock or wildlife while maintaining the land and watersheds in a healthy condition. Grazing systems are used to achieve this goal. Long-term successful grazing systems must do the following:

1. Balance livestock numbers to forage supplies;
2. Distribute livestock and grazing uniformly over the range, thereby reducing selective grazing;
3. Provide adequate recovery periods for plant species;

4. Maintain a healthy plant community and protect plants when they are most susceptible to grazing damage;
5. Maintain healthy watersheds and soil;
6. Meet the physiological needs of the animals;
7. Optimize livestock gain per acre; and
8. Be economically sound, practical to implement, simple to operate, and flexible.

Impacts of poor grazing management
Improper grazing management reduces plant tolerance to stress, cold, drought and disease.

Excessive defoliation results in desirable forage plants being replaced by less desirable species and reduction of surface litter levels, resulting in increased amounts of bare ground and risk of soil erosion. The water and mineral cycles cease to function efficiently and overall range and pasture productivity declines.
Frost-damaged alfalfa plants usually regrow and recover from:

Livestock behaviour
An understanding of livestock behaviour is fundamental to recognizing problems associated with grazing. Animals are creatures of habit, using the same territories repeatedly, often leaving as much as 65 per cent of available pasture untouched. Livestock develop preferences for certain plant species and learn to become highly selective during grazing. They choose green leaves over stems and old forage. If given the opportunity, they regraze individual plants several times during the growing season, eating the succulent regrowth. These behavioural grazing preferences weaken the preferred forage plants.

Livestock show other behaviours that directly influence grazing. They are reluctant to use slopes exceeding 15 per cent, and in rolling terrain seldom graze at elevations greater than 70 metres above water. Grazing is also limited by the horizontal distance from water. Livestock rarely graze further than 2.5 km from water. They readily seek shade during hot summer periods, resulting in high usage of forested and riparian areas.

Controlling livestock behaviour improves animal distribution and plant use. Fencing, salt/mineral placement, herding, and water development are used to influence where and what animals graze. Grazing systems control time, intensity and frequency of grazing on individual plants.

Read the full article on the Saskatchewan Agriculture website, which includes principles of intensive grazing, the Saskatchewan experience, tips for implementing an intensive grazing program and definitions of commonly-used terms.

Saskatchewan Hay Market Report

Saskatchewan Ministry of Agriculture
www.agriculture.gov.sk.ca/FeedForageListing

For the week ending May 27, 2016, there are no listings for forage wanted or for sale on the Ministry of Agriculture Feed and Forage listing. A review of other sources (Kijiji, Western Producer) revealed listings for hay wanted as well as hay for sale. Hay asking prices ranged from $40-$100/bale with no bale weight listed and from $175-$240/metric tonne, based on quality, bale type and composition. On offer were grass hay (3 ads), mixed hay (7 ads), greenfeed (2 ads) and first- and second-cut alfalfa (6 ads). Small squares were also advertised for sale from $5-$8/bale. There were fewer than ten advertisers looking for hay to purchase either as standing hay or bales. No prices were associated with these requests.

USDA Market News Service Hay Report

For the week ending May 27, 2016
The United States Department of Agriculture (USDA) collects a wide variety of information from hay markets across the country. Presented below is information from those jurisdictions closest to Saskatchewan. For complete USDA hay market listings, please visit the USDA Market News webpage.

Weekly Montana Hay Report
Compared to last week: Alfalfa hay sold generally steady this week on very light demand and movement. Very light movement of hay was seen again this as many ranchers are fully turned out to pasture and range in the eastern portions of the state. Western areas and higher elevations continue to turn out cattle as weather permits. Producers looking forward to next year's crop are starting to offer contracts. Many producers in the southern and central portions of the state have offered contracts from 100.00-115.00, and even as high as 120.00. However, only a limited number of sales can be confirmed. Lower asking prices reflect the lower prices seen across much of the Pacific Northwest as well as the Dakotas. Grass hay saw very light demand and very light movement this week. All prices are dollars per ton and FOB unless otherwise noted.

Wyoming, Western Nebraska, and Western South Dakota Hay Report
Compared to last week: All classes traded slow with light demand. According to the Wyoming NRCSS Snow Report, last year on this date the state median was 86% with a low of 0% and a high of 270%. This year the state median is 139% with a low of 0% and a high of 580% of median. According to Nebraska NASS report, alfalfa first cutting was at 13 percent, ahead of 0 last year, but behind 10 average. All prices dollars per ton FOB stack in large square bales and rounds, unless otherwise noted. Most horse hay sold in small squares. Prices are from the most recent reported sales.

See the following page USDA hay price listings for the week ending May 27, 2016 for Montana, Eastern Wyoming, Western Nebraska and Western South Dakota.

USDA Hay Prices for the week ending May 27, 2016

	Eastern Wyoming	Western Nebraska	Western South Dakota	Montana
Alfalfa				
Supreme	-	-	-	$200**
Premium	-	$120	-	$135-150 $150**
Good	$100-105	-	$70	$120 $130-140* $120**
Fair	$80-85	$70	$60	$100-120 $100-120*
Utility	-	-	-	$75-85*
Grass				
Premium	-	-	-	$130*
Good	-	-	-	$110-125 $115-120*
Fair	$30	-	-	$60-90 $60-100*
Alfalfa/Grass				
Good	-	-		$125-140* $150**
Fair	-	-		$90-115
Timothy		-		
Good - Premium	-	-		$120* $150-200**
Straw	-	-	-	$35-40

*All prices in U.S. dollars per ton FOB stack in large square bales unless otherwise noted. Most horse hay sold in small squares. * large rounds **small squares*

Hay Quality Designations - Physical Descriptions:

Supreme: Very early maturity, pre bloom, soft fine stemmed, extra leafy - factors indicative of very high nutritive content. Hay is excellent colour and free of damage. Relative Feed Value (RFV): >185

Premium: Early maturity, i.e., pre-bloom in legumes and pre head in grass hays; extra leafy and fine stemmed - factors indicative of a high nutritive content. Hay is green and free of damage. RFV: 170-185

Good: Early to average maturity, i.e., early to mid-bloom in legumes and early head in grass hays; leafy, fine to medium stemmed, free of damage other than slight discoloration. RFV: 150-170

Fair: Late maturity, i.e., mid to late-bloom in legumes and headed in grass hays; moderate or below leaf content, and generally coarse stemmed. Hay may show light damage. RFV: 130-150

Utility: Hay in very late maturity, such as mature seed pods in legumes or mature head in grass hays, coarse stemmed. This category could include hay discounted due to excessive damage and heavy weed content or mould. RFV: <130

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