



Fort Keogh Researcher

November 2011



In cooperation with



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Introduction

Dr. Mark Petersen, Research Leader

Hello from Fort Keogh Scientists, Staff, Cow-boys, and Students!

As we approach the Holiday season, we hope everyone has a wonderful time with their friends and families. We have many accomplishments since the last newsletter. In June, we hosted the Western Section of the American Society of Animal Science. Andy Roberts, a Reproductive Physiologist, was the current president and facilitated organization of the meeting. The Beef Symposium, which occurred the day before the conference, was quite unique when compared to what we usually think of as a symposium. It was organized as a moving symposium walking or riding around the facilities and discussing history, discoveries, and the people who were behind

those breakthroughs. The 3 retired Bobs (Bob Bellows, Bob Short and Bob Staigmiller) were specifically recognized for their contributions to the Western Section and research success at Fort Keogh. The meeting then moved to the campus of Miles Community College for 2 days of technical sessions. The facilities were perfect and we appreciate the effort Miles Community College expended on our behalf for a successful conference. Then a couple of weeks later, Mike MacNeil, as site coordinator and planning committee Co-chair, facilitated the Beef Improvement Federation (BIF) meetings on the campus of Montana State University. In addition, Mike was awarded the BIF Pioneer Award. The meeting was well attended, followed by a day of tours. Mike was also

recognized at the annual meeting of the American Society of Animal Science with the Rockefeller Prentice Memorial Award in Animal Breeding and Genetics.

Earlier in the winter, our traveling seminar we call "Fort Keogh on the Road" went to Roundup. Through Rachel Endecott, MSU Beef Cattle Specialist (housed at Fort Keogh), a program was organized with topics requested by producers around Roundup. We presented nearly 5 hours of educational material with a lot of good discussion with the attendees. Our host provided a great lunch with barbequed flat iron steaks. This next winter we are tentatively scheduled to go to Big Timber.

This summer we had a number of graduate, undergraduate and high school students from

MacNeil Receives Pioneer Award

The Beef Improvement Federation (BIF) honored Michael MacNeil with the Pioneer Award during the organization's 43rd annual meeting and research symposium in Bozeman, Mont., June 1-4. The award recognizes individuals who have made lasting contribu-

tions to the improvement of beef cattle, honoring those who have had a major role in acceptance of performance reporting and documentation as the primary means to make genetic change in beef cattle.



Introduction (continued)

various locations conduct research or work at Fort Keogh. They came from Montana State, New Mexico State, North Dakota State, Ohio State, South Dakota, University of Missouri, University of Georgia, and our local Miles City Community College and Custer County High School. The students add a lot of spontaneity and we appreciate their participation in our research.

The winter of 2010-2011 was hard on us in a number of ways. It was a challenge for our cows, feed supplies, and people, but the biggest casualty was the Historic 1902 Bridge that crosses the Yellowstone River on the northeast side of the research laboratory. It was first injured by the ice flow/jam and then the high water associated with the flood. The power of the water flowing down the river was tremendous. Unfortunately the damage to the bridge was fatal. We will start demolition in December and hope to have the super structure off before the river ices over. We are sad to see the bridge go due to both its historical status and its facilitation of our operations across the river.

The scientist and the scientific staff are making great progress on a number of fronts. We are working to identify genetic associations with the composite herd (CGC) for important traits. In another endeavor we are collaborating with a French Company testing a new technology evaluating bull fertility. This

instrument will allow for thousands of measurements in less time than is required to conduct a single breeding soundness exam. Our range group was fortunate to attract Dr. Marnie Rout into a post doctoral position (a graduate of University of Montana). Dr. Rout wrote the feature article you will find on page 3 of the newsletter. She is working with Kurt Reinhart and Lance Vermeire investigating the relationships of fire frequency and intensity on the below ground plant growth and microorganisms that help plants grow which are found in our rangeland. This study could lead to new practices that are intended to improve fertility of native grasslands. In another aspect of our research efforts, we are in the process of developing our next 5-year research projects that will be implemented in 2013. Due to the long-term nature of most of our studies, the next project will by necessity be a carryover of on-going efforts but also new objectives have been identified. One of the changes we are making in the next project is enhanced collaboration between our range and beef research groups. We expect that this will add to the new knowledge we acquire from these studies.

We would like to close this portion of the newsletter with wishing Dr. Michael MacNeil, our Quantitative Geneticist, best wishes in his new endeavors. Mike has announced his retirement

beginning in 2012. Mike has been an integral component of Fort Keogh research for 23 years. He is well known for a number of accomplishments but his direction of the Line 1 Hereford selection study is a distinctive success. We are all very proud of the role Line 1 played in the Bovine Genome Project. Those of you that collaborate with, call, or email Mike will find he will be active and available in the field and as he says he is "just changing offices." The Fort will miss Mike. Then a second retirement to announce is our Area Director in Fort Collins at the NPA Area Office, Dr. Will Blackburn, also announced his retirement at the end of the year. Dr. Blackburn has been a staunch supporter of Fort Keogh and we will miss his backing.

We will participate in the Chamber of Commerce Christmas Stroll on December 2nd. From 12:00 to 3:00 p.m., we will have an open house and social hour. We will have holiday treats and drinks available. There will be the inaugural showing of a print by Gene Larson entitled "Fort Keogh" and we will make available interesting 20 minute laboratory tours. Please come by to see us!

When you are in the area, please stop by the Fort and say hello. We would like to find out what is going on at your place and would love to show you around.

Fort Keogh Hosts Beef Symposium

June 21, 2011 – Fort Keogh hosted the Western Section of the American Society of Animal Science Beef Symposium which included a tour of the station starting with a welcome and overview and continuing on with a walking tour of the history of Fort Keogh and history of the horse program. At the horse barn, retired scientists, Bob Short and Bob Staigmiller, gave talks about their research and Tom Geary and Andy Roberts gave presentations on the current research program. At the Scalehouse, Rachel Endecott and Andy Roberts talked about the Growsafe feeding setup. Lunch was



Dr. Mike MacNeil talks to about 100 participants during the Western Section of the American Society of Animal Science Beef Symposium held at Fort Keogh on June 21, 2011.

served under a tent at headquarters. After lunch, buses took participants to the Hogback area south of the station for talks about range. Upon return to headquarters, Mike MacNeil gave a talk about the history of the genetics research and tours of the new labs were given by Lee Alexander and Richard Waterman. It was a great day with ~100 participants.

New Research Post Doc at Fort Keogh

By Marnie Rout, Post Doc Range Ecology

As the NKOTB here at Fort Keogh, it is my turn to attempt to explain what brought me here. That in itself is a complicated answer; so I will tell you a little about where I have come from, and more about what I study and my passion in life. For those of you that are still wondering, that acronym was **New Kids On The Block**- yes, my acronym usage was an attempt to conform to the governmental affinity for acronyms. It might reflect my age but not my taste in music, I assure you.

Miles City, Montana is a long way, geographically, from where I was raised. I grew up in Oklahoma in a farming family. My father has been in the business of land, cattle, and oil my entire life; just like his father and uncles were previously. Like many farmers, my dad has relied on the USDA-Agricultural Research Service (ARS) for valuable and relevant information throughout the years. In fact, when I told my father that I was taking a position as a scientist with the ARS, it was almost like he had died and gone to heaven. It might be difficult for some to understand this analogy, but to my father, the ARS is like Fenway Park is to a Red Sox fan. In many ways, Miles City brings me home to my roots.

To borrow an expression from my mother-in-law, I am a "flat lander", so I never knew what beauty awaited me here in Montana. I know that my fellow "Okie" and Range Ecologist here at Fort Keogh, Dr. Lance Vermeire would tell you that Oklahoma has its own beauty, and it does. But I have to tell those of you that are native Montanans how blessed you are to come from this place. I have thoroughly enjoyed experiencing the landscape of Montana. I relocated to this state in 2006 to pursue my Doctorate, which I completed in May at the University of Montana. In an attempt to bridge disciplines that span micro and macro ecology, I earned a dual Ph.D. My research focus is on plant-microbe interactions. Fundamentally, I study forces of change across spatial scales – from genes to ecosystems. By training and design, my approach to science is highly integrative. This way of problem

solving makes complicated problems appear less complex. In other words, it makes finding solutions easier. Nature has many complex patterns; integrative solutions help us to recognize these patterns.

As an Ecologist, I have been intrigued by plant invasions, and they are one of the "paradoxical" things that we observe in nature. There is no shortage of negative impacts of invasive plants; they reduce native plant diversity, they reduce agricultural yields, and the pose serious economic costs to combat, just to name a few. While plant invasions are an unfortunate reality of our world today, they provide an opportunity to enhance our understanding of complex patterns in nature. My research has attempted to understand some of the mechanisms underlying plant invasions. I believe that studying the interactions plants have with microbial organisms can provide the foundation for this understanding. During my Masters and Ph.D. research, I have been interested in the plant-microbial interactions of one particularly successful invasive plant, *Sorghum halepense* (Johnson grass, Fig. 1). This grass was introduced to the southern U.S. in the late 1800s as a potential forage crop for cattle. Unfortunately, it can be highly toxic to herbivores due to a cyanide compound in the leaves. This grass has since become an aggres-

sive invader across the southern and costal regions in the U.S., while globally it has been listed by 54 countries as an invasive weed.

I am certainly not the first person to study this grass, but my approach to studying how this plant invades has been from a unique perspective - a *microbial* perspective. Through my research, I discovered several nitrogen-fixing (N_2 -fixing) bacteria inside the plant tissues, namely the rhizomes (the underground growth that occurs perpendicular to gravity). Using various molecular techniques (16S rRNA-based gene sequencing, Denaturing Gradient Gel Electrophoresis, quantitative PCR of functional genes) in combination with innovative experimental designs, this research has yielded several interesting findings: 1) the identities of five bacterial partners living inside the plant, based on bacterial gene sequence similarity; 2) the discovery that some of these N_2 -fixing microbes are vertically transmitted into the plant seeds; 3) the discovery that various microbes can also be recruited from the soil environment into rhizomes; and 4) the discovery that these bacteria contribute to several plant traits used by this invader for successful establishment and persistence.

You might be wondering how this line of research all came about. The short answer is that this work all stems from being in the field and observing how this plant invades (Fig. 2). Invasions from this grass often appear as lines or waves across the areas where it invades, which are often in agricultural ecosystems and remnant prairies. During my Masters research at the University of Texas in Arlington, I became fascinated by this invasion line and began what has now become long-term monitoring in this system. I have been monitoring changes to the plant and soil communities across a Johnson grass invasion gradient for over 7 years. Some of the most dramatic findings were from monitoring the soil biogeochemical pools across this gra-



Figure 1: Photo depicting the typical maximum height of Johnson grass, which usually varies between 6-10 feet.

New Research Post Doc (continued)



Figure 2: A Johnson grass invasion in Fort Worth, TX inside the Fort Worth Nature Center & Refuge. To the right of the flagging tape line (yellow) is the invaded area.

dient. Surprisingly, increased Johnson grass density corresponded with significant increases to several soil biogeochemical pools: (NO_3^- , P, K, Fe, Mg, Mn, Zn). It was this correlation between invasion density and the increase in plant-available soil nutrient pools that made me start to focus on the role that microbes could be playing in the invasion process.

As it turns out, by having these microbial partners inside the rhizomes, Johnson grass is able to get bigger, it is a better competitor against native grasses, and it is better defended against herbivory due to increased cyanide production. We described this as a novel invasion strategy, Microbial Enhanced Competitive Ability (MECA, Rout & Chrzanowski 2009), in which bacteria contribute to several invasive plant traits. For those interested in more details, I have two additional manuscripts under review that explain more details of these results.

This research is the first to suggest that traits of an invasive plant can be regulated by microbes. These findings raise more questions than they answer. For example, how common is this among plant species, let alone invasive plants? Clearly, this work suggests that expression of plant plasticity involves not only the plant genes, but can involve microbial activity that directs gene expression. To disentangle this complex interaction between the plant and these bacterial partners, my

colleagues and I have a grant pending with the National Science Foundation. With collaborators at The University of Montana and the University of Georgia in Athens, we hope to further explore the microbial regulation of gene expression patterns in Johnson grass. Using this invasive grass as a model, we might better understand the role that microbes have on the expression of plant traits.

With my background in plant-microbe interactions, I was hired by the Range Ecology group to serve Fort Keogh as a Postdoctoral Molecular Biologist. Dr.'s Kurt Reinhart and Lance Vermeire received funding to study the impact of fire as a management tool in rangeland ecosystems. The goal of this research is to build a science-based understanding of recovery processes post-fire. My role is to disentangle the impacts of fire on soil microbial functions at a molecular level, with emphasis on the N_2 -fixing bacteria that provide the foundation for nitrogen cycling.

I was fortunate to be able to contribute to the experimental design of this rangeland research project. This integrated project contributes to ongoing research objectives of the USDA Current Research Information System (CRIS), and incorporates research projects of two North Dakota State University graduate students (Dustin Strong, MS Candidate, and Morgan Russell, Ph.D. Candidate) currently advised by Dr. Vermeire. Through this integration, we are collecting a myriad of information to quantify rangeland recovery post-fire: community and individual plant assessments; soil nutrient pools, cycles and plant uptake; and fluxes in the function of key microbial genes relevant to nitrogen cycling. Ultimately, this project will help us to understand how fire affects the health and resilience of rangelands. The data generated from this project will be very valuable for land managers. Specifically, this research will inform management decisions concerning utility of prescribed burning, deferment, and rest of regional rangelands.

For those of you that are still reading this article, you now know that I'm an

Okie that thinks microbes are interesting organisms that influence plants and soils in complex, but cool ways! As I mentioned in the opening paragraph, I said that I would tell you about my passion in life. As with most of the crazy scientists that I have gotten to know throughout my years of training (to become one of those crazy scientists), my passion is connected to what I study. Now, before some of you start generating bizarre thoughts in your mind about my passion for microbes, let me explain. It involves science education. I strongly believe that if we get people involved in the scientific process early and often in life, we will accomplish two powerful goals: 1) we will create a population of more scientifically literate people; and 2) we will generate better solutions to the problems facing our world. These are not "pie-in-the-sky" ideals. The scientific process teaches us to first observe the natural world, then we proceed with hypotheses that might explain these observations, predictions, tests, etc. This concept is the scientific method, and it works for many things, not just those that we categorize as "science". This approach to problem solving teaches us how to be better thinkers. In doing so, it enhances our understanding in ways that often challenge our preconceived ideas. One way that I can enhance scientific literacy is through direct mentoring of students.

Direct student mentoring is an approach that I believe in, and I have engaged in this at all levels of my training. So, while I was learning I was also teaching others. Currently, I am fostering a relationship between this ARS facility and Miles Community College (MCC) to stimulate student involvement in scientific research. My goal is to seek external funding through grants to provide financial support for undergraduate research opportunities. The world is full of problems, many of which are nothing more than a lack of understanding. I believe that as people become more educated about a subject, they are less likely to be part of the problem, and are more likely to help find solutions.

Press Releases & Notes of Interest

International Partners Improve Cattle here and in South Africa

By Dennis O'Brien, October 6, 2011

A U.S. Department of Agriculture (USDA) scientist has developed a partnership with colleagues in South Africa that is improving prospects for cattle breeders in that African nation—and could improve them for breeders around the world.

Efforts by Mike MacNeil, an Agricultural Research Service (ARS) geneticist at the agency's Fort Keogh Livestock and Range Research Laboratory in Miles City, Mont., are designed to equip South Africa's scientists with better research tools to help cattle breeders and farmers in remote, underdeveloped areas. ARS is USDA's principal intramural scientific research agency, and this research supports the USDA priority of promoting international food security.

Much of the research focuses on Nguni (pronounced en-GOO-nee) cattle, an indigenous breed popular among poor and emerging farmers in South Africa because of its fertility, tolerance to harsh conditions, resistance to ticks and tolerance to tick-borne diseases. In a recent study, MacNeil and his colleagues examined ways to address a chronic problem: Nguni that are too small and deposit too much fat before reaching market weight, making them undesirable for commercial feedlot operations.

They examined factors that breeders could consider in trying to improve progeny of their Nguni cows by mating them with larger and beefier Angus and Charolais bulls. The resulting crossbred ideally would retain the Nguni toughness and adaptability, but would take on the improved beef aspects of the Angus and Charolais sires. The research, published in the *South African Journal of Animal Science*, built on MacNeil's work at Fort Keogh on development of crossbreeding systems and breeding objectives for U.S. domestic breeds.

Olivia Mapholi, a scientist with the South African Agricultural Research Council who studied under MacNeil at Fort Keogh, continues to consult him as she searches for quantitative trait loci (QTLs), or areas of the cattle genome, that confer the ability to tolerate tick-borne diseases. Mapholi is crossing tick-resistant Nguni with tick-susceptible Angus and is looking for genes that confer resistance to ticks. Her research could benefit beef production in any part of the world where ticks are a problem, including the United States.

USDA-ARS News & Events

<http://www.ars.usda.gov/News/News.htm>

Less Feed Does Not Alter Heifer's Metabolism

By Sandra Avant, August 10, 2011

Agricultural Research Service (ARS) scientists at our Fort Keogh Livestock and Range Research Laboratory (LARRL) in Miles City, Mont., have found that harvested feed inputs can be reduced in a heifer's development diet without changing the young cow's metabolism.

Animal scientist Richard Waterman and his colleagues at LARRL evaluated metabolic influence of reduced harvested feedstuffs in heifers as part of a series of long-term studies. They examined blood glucose and acetate concentrations to find out how nutrients differed between heifers fed reduced amounts of feed compared to heifers allowed to eat all that they could consume.

Scientists evaluated efficiency of energy nutrient uptake in heifer calves born from cows that had received 2.4 pounds or 4 pounds of winter supplementation daily during late gestation. Heifers were then randomly assigned to postweaning development treatments, which consisted of different feeding levels of a corn silage-based diet for 140 days after weaning: either all they could eat, or 20 percent less feed based on a common body weight.

During the 140-day development period, heifers who received the unlimited feed grew faster than the heifers receiving 20 percent less feed on a similar body weight basis, according to Waterman.

However, it took less feed for the limited-diet heifers to gain a pound of body weight than the heifers allowed unlimited feed, an indication that reduced feeding may improve efficiency of growth, according to Waterman. Following the development period, heifers were managed as a single herd until the following winter, when they were split into corresponding lifetime winter cow treatment groups.

Heifers receiving less feed during development had the same glucose and acetate nutrient uptake—comparable indicators of energetic efficiency—as heifers that were allowed unlimited feed, according to Waterman. Results indicated that the amount of feed required and the costs could be reduced with no detrimental effects on uptake of glucose and acetate.

Concurrent research at LARRL shows a \$21 advantage for producers for each heifer developed under reduced feed, according to Waterman. This savings in harvested feed costs alone can account for millions of dollars, considering there were 5.2 million heifers held as replacements in 2010 alone, he adds.

Results of this research were published in *British Journal of Nutrition*.

Fort Keogh Outreach Activities

October 27, 2011—Marnie Rout gave a presentation to 10 Miles Community College Agricultural Students on careers and possibilities with Fort Keogh and the USDA-Agricultural Research Service.

September 30, 2011 – Lance Vermeire gave a talk on using visual obstruction to estimate rangeland standing crop to the Grazing District in Terry, Montana. There were about 35 participants.

September 28, 2011 – Mark Petersen hosted 16 disabled clients from the Mental Health Center for an overview of Fort Keogh and a short tour. The group enjoyed the tour and asked many good questions. The goal for this group is to introduce them to something they do not come in contact with on a regular basis.

September 14, 2011 – Mike MacNeil was asked to speak at the National Sheep Improvement Program at the producer information session accompanying the annual ram sale on: “Addressing producer concerns in application of estimated breeding values (EBV).”

July 3, 2011 – Matt Rinella, instructor at the North American Invasive Plant Ecology and Management Short Course (NAIPSC) in North Platte, NE.

July 11-14, 2011 – Mike MacNeil and Andy Roberts attended the American Society of Animal Science meetings held in New Orleans, LA. Dr. Mike MacNeil was awarded the Rockefeller Prentice Award in Breeding and Genetics from the American Society of Animal Science. This is the highest honor that is awarded to an Animal Breeder/Geneticist. Andy gave an invited talk titled “Management and genetic factors affecting efficiency of cattle in a grazing environment” during the Beef Species & Ruminant Nutrition Joint Symposium Cow Size, Genetics, Management and The Beef Industry. Fernanda Abreu, Ohio State University, graduate student of Dr. Tom Geary, presented a poster titled “Effect of follicle age on conception rate in beef heifers.” Yijian Huang, North Carolina State Uni-

versity, Raleigh, graduate student of Dr. Mike MacNeil, presented a poster titled, “Using single nucleotide polymorphism to detect selection signature in Hereford beef cattle.”

June 24, 2011 – About 50 Ag teachers from Montana/North Dakota visited Fort Keogh. Mark Petersen, RL, welcomed them and did an overview of Fort Keogh and our current research. The tour continued on at the Horsebarn with Tom Geary giving an overview of the reproductive research, at the Scalehouse Andy Roberts covered the calan gates and Growsafe systems and the CGC study females, and Rachel Endecott talked about the CGC study males program. The tour continued out to the Hogback area where Richard Waterman talked about cow metabolic adaptability and Mark Petersen talked about cow variability.

June 20-22, 2011—Fort Keogh hosted the Western Section of the American Society of Animal Science meetings with a Beef Symposium held at the station.

June 2, 2011 - Judith Basin County Range School, Geysers Community Hall, Geysers Montana – Andy Roberts gave an invited talk titled, “Improving Reproduction Efficiency In Your Cow Herd.”

May 23, 2011 – Mark Petersen and 4 students hosted a group of 20 students from four Texas Universities for a talk about careers and how our agency works.

May 2-4, 2011—Fort Keogh hosted over 400 first and fifth grade students from Eastern Montana for our annual School Days tours and presentations.

April 20, 2011 – Mike MacNeil gave a talk to 60 third graders at Highland Park School on his work with Africa.

April 21, 2011 – Matt Cronin, Stacy Kageyama, and Crystal Roberts talked and did demonstrations at the Earth Day activities at Garfield Elementary School.

Recent Publications

Abreu, F.M., Cruppe, L.H., Roberts, C.A., Jinks, E.M., Pohler, K.G., Day, M.L., Geary, T.W. 2011. The effect of Follicle Age on Pregnancy Rate in Beef Cows. Meeting Proceedings. 62:58-61.

Endecott, R.L., Shipp, B.L., MacNeil, M.D., Alexander, L.J., Roberts, A.J. 2011. Feedlot Performance and Carcass Characteristics of Calves From Dams With Different Levels of Winter Supplementation Developed With or Without Feed Restriction During the Postweaning Period. Western Section of Animal Science Proceedings 62:189-192.

Jiang, Z., Michal, J., Wu, X., Pan, Z., MacNeil, M.D. 2011. The Heparan and Heparin metabolism pathway is involved in regulation of fatty acid composition. International Journal of Biological Science 7(5):659-663.

Kelly, W.L., Waterman, R.C., Roberts, A.J., Endecott, R.L., Petersen, M.K., Geary, T.W., Alexander, L.J., MacNeil, M.D. 2011. First Parity Evaluation of Body Condition, Weight, and Blood Beta-Hydroxybutyrate During Lactation of Range Cows Developed in the Same Ecophysiological System but Receiving Different Harvested Feed Inputs. Western Section of Animal Science Proceedings 62:253-256.

MacNeil, M.D., Lopez-Villalobos, N., Northcutt, S.L. 2011. A prototype national cattle evaluation for feed intake and efficiency of Angus cattle. Journal of Animal Science 11:R102 (online serial).

Petersen, M.K., Muscha, J.M., Roberts, A.J., Mulliniks, J.T. 2011. Range Cattle Winter Water Consumption in Northern Great Plains. Western Section of Animal Science Proceedings 62:73-75.

Petersen, M.K., Reil, M.S., Muscha, J.M., Mulliniks, J.T. 2011. Access to warm drinking water prevents rumen temperature drop without affecting in situ NDF disappearance in grazing winter range cows. Western Section of Animal Science Proceedings 62:335-336.



Assistant's Corner

by Brad Eik

Reil, M.S., Mulliniks, J.T., Muscha, J.M., Waterman, R.C., Petersen, M.K. 2011. In Vitro Evaluation Mimics Influences of Winter Cold Water Ingestion on Ruminal Function. Western Section of Animal Science Proceedings 62:397-400.

Ujazdowski, V., Waterman, R.C., Petersen, M.K. 2011. The Role of Rumen-Protected Methionine on Amino Acid Metabolism in Late Gestation Beef Heifers in the Northern Great Plains. Western Section of Animal Science Proceedings 62:309-313.

Vermeire, L.T., Roth, A.D. 2011. Plains prickly pear response to fire: Effects of fuel load, heat, fire weather, and donor site soil. Rangeland Ecology and Management 64:404-413.

Waterman, R.C., Roberts, A.J., Endecott, R.L., Petersen, M.K., Geary, T.W., Alexander, L.J., MacNeil, M.D. 2011. First parity evaluation of peak milk yield for range cows developed in the same ecophysiological system but receiving different concentrations of harvested feed inputs. Western Section of Animal Science Proceedings 62:249-252.

Waterman, R.C., Roberts, A.J., Geary, T.W., Grings, E.E., Alexander, L.J., MacNeil, M.D. 2011. Effect of reduced heifer nutrition during in utero and post weaning development on glucose and acetate kinetics. British Journal of Nutrition doi:10.1017/S0007114511002224.

Please check our website at <http://www.ars.usda.gov/npa/ftkeogh> or email sue.miles@ars.usda.gov for these and other publications.

Richard Waterman, Ruminant Nutritionist, explains how the cows are fistulated and what information he can obtain from these animals to fifth grade students during School Days in May.

Greetings from the outside operations crews! I hope everyone's fall is going great and folks are enjoying the strong cattle market. It is truly an amazing time to be part of the cattle business and we look forward to this strong market holding on for a few years down the road. We have had a busy fall getting calves weaned in the feedlot and getting feed ready for the winter. We are all wrapped up with weaning with the exception of the season-of-calving late cows. Those calves will be weaned on Nov 15th. I will include some weaning weights in my next article. We had a good summer for crop production and all the hay is stacked and silage is in the pit and packed. We averaged 27 tons per acre on our silage corn this year and over 5 tons per acre on our alfalfa. We were able to take advantage of some extra grass thanks to all that spring moisture by cutting and baling several fields that would have traditionally been grazed. It really helped us to get a hay cushion after having to buy 300 bales last spring to get through the long winter. We also raised all hay barley this year and no grain barley in order to increase our forage production. Just a quick update on our informal fly control study for the summer. We split half the cow herds into two treatments -half had

our range mineral with IGR added and the other half received the Bayer brand Corathon fly tags. One fly tag was given to the cows, two for each bull, and the calves did not get a tag. The mineral was all fed free choice. Our results were that the fly tags seemed to do a better job of controlling the flies. There were several factors against the mineral, however, and we will be continuing this study for the next couple years to see if the results are similar.

It's hunting season once again and the Fort has several pastures set aside for the Fish, Wildlife, and Park's (FWP) Block Management program again; we have done this for the last 20 years to allow the public to come out and enjoy the land and the wildlife we have to offer. Last year the FWP received 286 comment/report cards from hunters on Fort Keogh of which there were 269 satisfied hunters and only 17 unsatisfied hunters. On a final note before I sign off, we are once again donating a steer calf to the Miles Community College's (MCC) *Steers for Pioneers* program and are happy to continue our support of that program. It's a very worthwhile fundraiser for MCC clubs and teams. Everyone enjoy the fall weather, the great cow market, and of course some good football! GO COWBOYS!!





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«AddressBlock»

We're on the web!
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If you have email and would rather receive this newsletter as a .pdf file, send an email to diona.austill@ars.usda.gov

Fort Keogh Open House!

December 2, 2011
 12:00—3:00 p.m.

Introduction of
 Fort Keogh Print
 By Gene Larson
 Come meet the artist!

Pointillism is a technique of painting in which small, distinct dots of pure color are applied in patterns to form an image and takes hours to complete—286 hours for this one!

