Grass Clippings

pasture research you can use

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UW Extension • UW-Madison Center for Integrated Agricultural Systems and College of Agricultural and Life Sciences • UW Agricultural Research Stations

In this issue

New year, new farm?

Late winter was traditionally the time to take possession of a new farm property. My own parents did just that in February 1959 and again in 1966, while doubling from two children to four and cow numbers from 20 to 40 along the way. I suspect the idea of the late winter transition was to get everyone (people and critters) settled in before the busy spring season began. Most of us are quite happy where we are and not in the market for a new property, but who doesn't drive by the occasional real estate sign and think about the possibilities?

Remember those first mornings of possession of your new place? Getting chores done, then exploring the new farm—from the nooks and crannies in the

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Making the most of your nutrients in feed, milk and manure

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As the price of feed escalates and demands for environmental accountability increase, many dairy farmers are seeking new ways to maximize feed conversion into milk and to reduce manure output and environmental risks. Research on confinement farms has shown us that dairy rations can be better formulated to fully meet the nutritional requirements of high producing cows, while, at the same time, reducing manure nutrient loads and therefore the risk of nutrient loss and environmental contamination.

But, what about grazing-based systems? Should graziers be concerned about feed conversion and environmental risk associated with overfeeding certain nutrients? Recent and ongoing studies in the USA and overseas are suggesting that the same issues of surplus nutrient intakes are present in cows within grazing-based systems. And while less research has been conducted on grazing-based systems, relationships between feed-milk-manure and environmental outcomes discovered on confinement dairy farms may assist grazing-based dairy farms to enhance feed nutrient use and the environmental performance of their operations.

Nutrient cycles

Nutrients (such as nitrogen and phosphorus) pass through a continuous cycle on dairy farms (see figure on next page). Cows are fed homegrown and imported feeds to produce milk; manure is applied to cropland and pastures; manure nutrients are then utilized by plants to produce feed; and so on.

The nutrient cycles and management interventions on confinement- and grazing-based dairy farms are quite different. In general, dairy cows on confinement farms are fed conserved forages plus protein and mineral supplements; and manure is collected, stored and applied mechanically to cropland. On grazing-based dairy farms, cows are generally allocated pasture or forage

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house, to the new layout and equipment in the barn and other buildings, even those trails in the woods? Remember looking over the landscape and seeing in your minds' eye just what YOUR new farm will look like in a few more years?

Those days may seem long in the past on yet another frigid winter morning, where the surprises come along in the form of a frozen livestock waterer, a tractor that doesn't start, or a favorite cow down after slipping on the ice. By the time chores are done, there's little energy left for dreams. On the way into town to pay bills and buy tractor parts, that rural acreage down the road looks pretty good—just get jobs in town and spend the weekends fishing, right?!

At some point, that dream may become the right choice, but today, its time to refocus our vision on the "new farm" that we are standing on right here at home. "New farm" because it is

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Grass Clippings features grazing-related research news from the University of Wisconsin and beyond.

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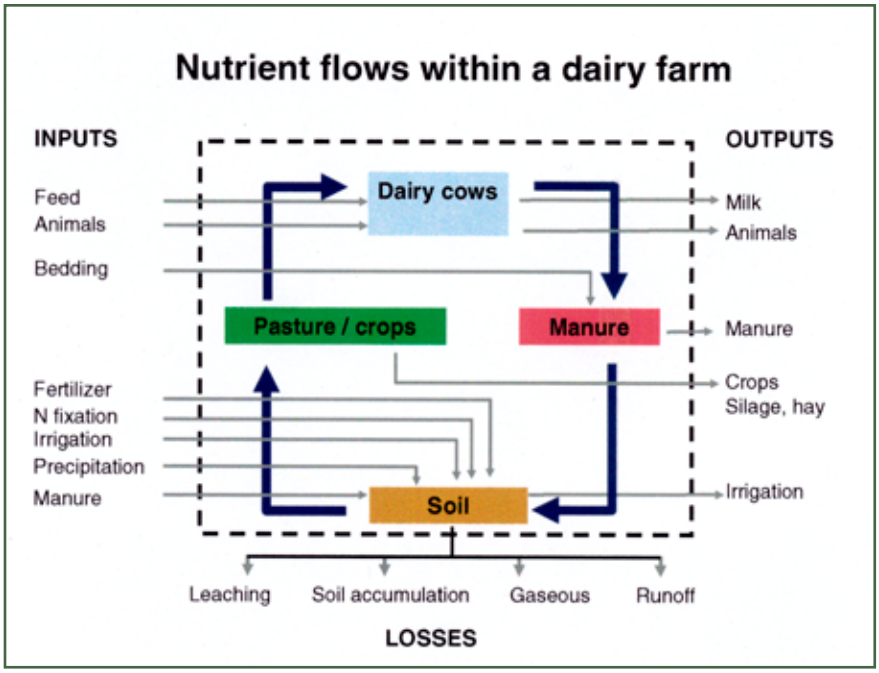

Nutrients in feed, milk and manure ... *from page 1*

crops directly in the paddock; less supplements generally are used; and, while some manure is collected and mechanically applied, most manure is deposited directly onto pasture by the cows.

Most technologies aimed at enhancing the feed use efficiency (more milk, less manure) and improving the environmental performance of dairy farms have been geared towards confinement farms and methods that improve manure collection, storage and land application. More recently, research work has investigated the linkages between nutrient consumption by dairy cows, manure nutrient excretions and environmental loss.

This nutrition research has been applied to confinement dairy farms and to evaluations of rations comprised of conserved alfalfa, corn silage, grain, protein and mineral supplements. Initial investigations have revealed how dietary decisions impact the type and amount of phosphorus excreted in manure, the cropland area farmers need to recycle manure phosphorus, and runoff phosphorus from cropland after manure application. Later investigations discovered how conserved forages and levels of dietary crude protein consumed by dairy cows impact the amount and form (feces-urine) of nitrogen excreted in manure and amount of nitrogen loss as ammonia gas after manure land application. Confinement dairy farmers, the feed industry and veterinarians have incorporated this new information to reduce nutrient concentrations in rations, enhance the efficient use of feed nutrients and reduce environmental risks of their operations.

Little is known about how dietary decisions on grazing-based dairy farms impact nutrient cycling and the environment. This is probably because grazing-based dairy farms have been generally viewed as more environmentally benign. For example, the direct deposition of manure on vegetated pastures is thought to pose much less of a risk to runoff losses than manure applications

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Nutrients in feed, milk and manure ... *from page 2*

to bare cropland, the conventional practice on confinement dairy farms. However, recent escalations in feed prices, diminishing farm profits and increasing demands for environmental accountability of all animal operations is calling for improved information and recommendations for nutrient cycling and efficiencies on grazing-based dairy farms.

Feed nutrient use efficiency

One measure of how well nutrients are being utilized on dairy farms is 'feed nutrient use efficiency.' This measure is relatively straightforward on confinement dairy farms. On the day of a farm visit, most confinement dairy farmers are able to relate what ration(s) they offered to their lactating cow group(s), either as a TMR or as individual feeds. Analyses of feed samples for nutrients, combined with information on milk shipped (bulk tank) and milk nutrient concentrations, provide the information for calculating feed nutrient use efficiency as follows:

$$\text{Feed nutrient use efficiency} = 100 \times \frac{\text{Nutrient in milk}}{\text{Feed nutrient intake}}$$

Our survey of 54 Wisconsin dairy farms shows that feed nitrogen use efficiency and phosphorus use efficiency on confinement dairy farms in Wisconsin generally range between 20 and 35%. Dairy farms that feed TMR, balance rations and milk three times per day convert the highest percentages of feed nutrients into milk.

While the same estimates of feed nutrient intake and nutrient secretion in milk are needed for dairy cows that graze, pasture quality and intake are difficult to measure directly. Therefore we use a series of back calculations to estimate nutrient intake from pasture. Equations are used to calculate a cow's metabolic energy (ME) requirement to produce milk, graze, walk and maintain physiological condition. The ME derived from pasture is calculated as the difference between a cow's total ME requirement and the ME contained in diet supplements (e.g., grain,

concentrates). The ME and nutrient concentrations in pasture grab samples completes the information needed to determine total feed nutrient intake. We have started to use these equations when surveying grazing-based dairies.

Preliminary feed nutrient use efficiency calculations from information collected on grazing-based dairy operations in Australia reveal a very similar range of feed nutrient use efficiency as obtained on confinement dairy farms in Wisconsin; efficiencies ranged from 15 to 30%.

The equations used to calculate the ME requirements of grazing dairy cattle are specific to a breed, body condition and weight, the slope of the land that is travelled and other factors. What has been developed in other parts of the world is likely not suitable for Wisconsin.

MUN measures nitrogen use efficiency

Excess protein in a cow's diet is either secreted as urea in milk or as urea in urine. Dairy farmers and feed consultants use milk urea nitrogen (MUN) to evaluate the sufficiency of dietary crude protein intake. MUN is also providing a useful indicator of feed nitrogen use efficiency. The highest feed nitrogen use efficiency is attained when MUN levels are low.

While MUN is an important indicator of dietary nitrogen intake, research has shown that MUN levels vary between morning and evening milking, and that MUN levels can also vary greatly when bulk tanks are sampled. Care should be taken to get representative milk samples.

The relationship between feed nitrogen intake and MUN for grazing dairy cows has not yet been well established. More effort in this research area could assist graziers to optimize the use of pastures and feed supplements, maximize feed nitrogen use, and enhance profits and environmental performance of their operations.

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New Year...*from page 2*

not the same place that it was in 2008, 2007, or all the year(s) back to that first day, is it? So take a fresh look around you today and enjoy the view—with gratitude for those accomplishments and improvements made through hard work. Update that vision of what YOUR "new" farm will look like in a few more years and make a list of what you'd like to do this year—after all, a new grazing year is coming fast!! Rhonda

Influence of fertility on pasture species diversity, yield and quality, part three

Nick Schneider, Winnebago County UW-Extension Agriculture Agent

A Grazing Lands Conservation Initiative-funded study performed at the Marshfield Agricultural Research Station during 2006 and 2007 helped researchers better understand the influence of fertility on pasture species diversity, yield and quality. Two locations of pasture forage mixtures were established on a high fertility plot and a low fertility plot. In part 1 of this series (*Grass Clippings*, April 2008), we reported on the effects of pasture soil fertility on species diversity. Part 2 (*Grass Clippings*, August 2008) of this series discussed plot differences in yield and forage quality. This final article features economic analysis of the plots and overall conclusions.

Economic Return

The dollar value of forage produced for each harvest was determined by multiplying the dry matter yield per acre by the price per ton derived from 'Pricer' (Howard and Shaver). Base feed prices were derived from summer 2007 prices including $3.25 per bushel corn, $12 per cwt soybean meal and $100 per ton hay.

From 2006 through 2007, the range in total value of forage was $623 to $856 per acre in the low fertility location and $827 to $996 in the high fertility location (Figure 1). Dollar value differences were strongly related to yield, but value was not affected by forage quality trends among treatments. Nitrogen-based treatments encouraged more grass growth, but forage quality analysis indicated that all treatments and harvest dates produced forage of acceptable quality for feeding lactating dairy cattle. In the low fertility location, nitrogen-based treatments clearly generated more forage dollar value while the untreated check had the least forage dollar value. In the high fertility location, only the nitrogen-based treatments generated a forage dollar value greater than the untreated check.

Additional comparison was performed by subtracting the cost of purchased fertilizer from the forage value to arrive at a net dollar return from nutrient applications per acre. Net return from nutrient applications initially were calculated with fertilizer prices at nitrogen=$.45/lb, phosphorus=$.35/lb, potassium=$.24/lb, micronutrient=$19.25/acre, and application cost of $4/acre. A second series of calculations were performed reflecting fall 2008 input prices increasing as follows: $4.50 per bushel corn, $15 per cwt soybean meal, $150 per ton hay, nitrogen=$.80/lb, phosphorus=$.85/lb, potassium=$.65/lb, micronutrient=$25.00/acre, and application cost of $6/acre (see Table 1 on page 5).

Regardless of the pricing structure and background soil fertility, the manure treatment resulted in the greatest net dollar return. No cost was associated with this treatment because it was assumed manure will be deposited by grazing livestock. In the high fertility location, the only profitable nutrient application was nitrogen applied in 2006, regardless of price. With below average precipitation during June and July, a 40 lb/acre nitrogen application did not generate a yield response during the June and July harvests in 2007 (not shown). Cosgrove (2006) found similar results when a June 15th nitrogen fertilizer application encouraged less growth than a May or August application. These findings

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Figure 1. Dollar value of total forage production

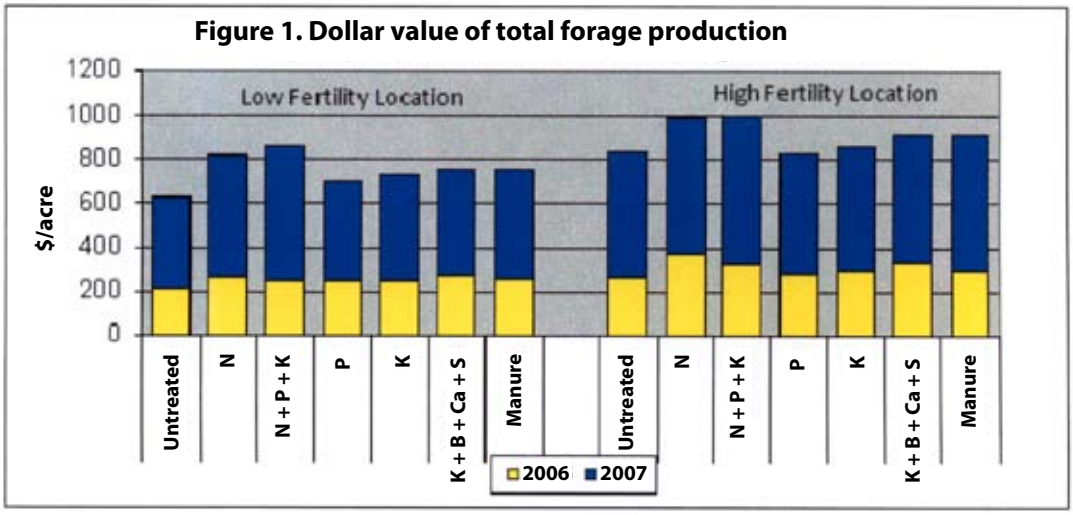

Table 1. Net Dollar Return from Nutrient Applications

Summer 2007 Prices

	Low Fertility Location			High Fertility Location		
Treatment	**2006**	**2007**	**Combined**	**2006**	**2007**	**Combined**
Untreated	$207	$416	$623	$313	$566	$879
N	+$13	+$80	+$93	+$61	-$6	+$55
N+P+K	-$36	+$73	+$37	-$18	-$17	-$35
P	+$23	+$19	+$42	-$14	-$27	-$41
K	$0	+$17	+$17	-$14	-$58	-$72
K+B+Ca+S	+$7	-$5	+$2	+$9	-$56	-$47
Manure	+$35	+$85	+120	+$26	+$49	+$75

Fall 2008 Prices

	Low Fertility Location			High Fertility Location		
Treatment	**2006**	**2007**	**Combined**	**2006**	**2007**	**Combined**
Untreated	$295	$605	$900	$377	$829	$1,206
N	+$5	+$106	+$111	+$84	-$20	+$64
N+P+K	-$74	+$15	-$59	-$37	-$111	-$148
P	+$21	+$17	+$38	-$15	-$48	-$63
K	-$37	-$39	-$76	-$43	-$143	-$186
K+B+Ca+S	-$65	-$69	-$134	-$50	-$139	-$189
Manure	+$58	+$135	+193	+$43	+$74	+$117

Pasture fertility... *from page 4*
indicate it may not be profitable to apply nitrogen during mid-summer when precipitation is lacking.

The majority of commercial fertilizer applications to the low fertility location contributed to a positive net dollar return at prices similar to the summer of 2007 and earlier. However, with the increase in fertilizer prices during the past year, applications containing potassium and micronutrients resulted in a net dollar loss. Excluding manure, the greatest returns were generated from the nitrogen and phosphorus treatments. Phosphorus is known to increase seedling vigor and data shows a $21/acre net return in the seeding year when phosphorus was applied. The potassium + micronutrients treatment had the least net return because soil nutrient levels of the micronutrients were not low enough to justify purchasing the added nutrients. When the high fall 2008 prices are used, it appears many nutrient applications to pastures may not increase growth enough to justify the higher cost.

Study Summary

Nutrient inputs influence pasture species diversity, quality, yield and profitability. Potassium content in the soil is susceptible to rapid decline if potassium is not returned to the pasture, either through manure or commercial fertilizer application. Potassium and nitrogen have the ability to influence the ratio of clover to grass. Nitrogen promotes dominance of grasses while potassium sustains a higher proportion of clover. Continuation of this research will help to reveal whether clover longevity is extended by adequate soil potassium.

Background soil fertility is a major contributor to yield. All treatments had greater yield when the background fertility was at a 'high' level rather than 'low'. Yield was unresponsive when potassium, phosphorus and micronutrients were applied to a high fertility location; however, there was a growth response to all nutrient additions in the low fertility location. Nitrogen applications have the ability to encourage the greatest yield increase regardless of background fertility.

Forage quality is largely influenced by nitrogen application because grass growth is promoted. Over all treatments, forage quality was adequate for lactating dairy cows. The dollar value of the forage grown is directly

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Nutrients in feed, milk and manure *... from page 3*

Relating feed-milk-manure measures to environmental laws

Feeding strategies that maximize feed nutrient use efficiency and reduce manure nitrogen excretions, especially of urinary nitrogen, can assist farmers in meeting air quality standards. Recent legislation has been enacted in the USA under the Clean Air Act to control emissions of harmful gases from animal operations. For dairy farms, these emissions relate mostly to ammonia and its potential detrimental impacts on human and ecosystem health. Ammonia is derived from urine. Gross estimates of total nitrogen excreted in manure and urine can be made from MUN.

Legislation has been enacted in the USA under the Clean Water Act to reduce phosphorus runoff from agricultural land where animal manure has been applied. To assist dairy producers in meeting the new manure phosphorus-based regulations, dairy nutrition research found that mineral phosphorus supplements could be eliminated from many dairy cow diets without any adverse impacts on milk production or reproductive performance. The direct relationship between dietary phosphorus consumption and fecal phosphorus excretion (negligible amounts of phosphorus are excreted in urine) determined experimentally was also found to be true on a wide range of confinement dairy farms in Wisconsin. We must also develop this relationship for grazing-based dairy farms in order to assist in better refining the type and amount of feed supplements to provide, especially during periods of uncertain pasture availability. However, during much of the year, pastures appear to provide sufficient dietary phosphorus.

Summary

Limited information is available on how feed and herd management on grazing-based dairy farms impact nutrient cycling and the environment. Interesting research and practical questions are: How well would relationships between feed-milk-manure determined on confinement dairy farms hold true for grazing-based dairy farms? Could this information be used in a similar manner to refine diets and to enhance profits and the environmental performance of grazing-based dairy farms? Studies on experimental and commercial, grazing-based dairy farms are needed to define, evaluate and recommend possible alternative feed, herd, manure and fertilizer management practices.

Dr. Powell is a Research Soil Scientist who utilizes crop, soil, animal and social sciences in an agro-ecological approach to develop dairy systems that enhance profitable crop/pasture-livestock production, natural resources and rural livelihoods. Dr Gourley is Senior Research Scientist with interests in soil, pasture and grazing animal research and extension for high rainfall and irrigated regions of Australia.

Pasture fertility... *from page 5*

related to the yield produced. Fertilizer expenditures have the greatest chance of a positive net dollar return when background soil fertility levels are low; however with the recent substantial increases in fertilizer costs, there may not be enough forage produced to offset the additional expense. Manure continues to be a vital nutrient source on grazing farms, clearly supported by the manure applications generating the greatest net dollar return. However, early data shows two tons of manure per acre per grazing event may not be enough to maintain soil fertility. Future research on fertility in pastures should focus on combinations of manure and commercial fertilizer applications.

High fertility location in May 2007

Acknowledgements

Thank you to the Grazing Lands Conservation Initiative for funding this study and the staff at the Marshfield Agricultural Research Station for providing equipment, time and labor.

Literature Cited

Cosgrove, D., 2006. *Nitrogen Management in Rotationally Grazed Pastures.* University of Wisconsin Board of Regents. Grazier's Notebook – Vol 1: No.1.

Howard, W.T., and R.D. Shaver. 1998. *PRICER Calculating Maximum Price for Forages Based on a Base Forage.* University of Wisconsin – Madison. Downloaded at: http://www.wisc.edu/dysci/uwex/nutritn/spreadsheets/Pricer.xls

Beef and dairy cattle gains on different pasture treatments

UW-Madison Center for Integrated Agricultural Systems

What are some good alternatives to orchardgrass for grazing? Do Holstein steers gain as well as beef steers on pasture? Supported by a USDA-CSREES grant, UW-Madison researchers Ken Albrecht of Agronomy and Jeff Lehmkuhler, formerly of Animal Sciences, conducted a three-year study to find out.

During 2005 through 2007, researchers rotationally grazed beef steers, beef heifers and Holstein steers on pastures at the UW-Madison Arlington Agricultural Research Station. Each animal weighed about 600 pounds when turned out in the spring in April or early May and was grazed until October or November. The total number of animals in the research varied from 125 to 200 head, as animals were added or removed from the study to match forage availability. Mineral supplements and water were provided free choice and a supplement to reduce bloat was offered to cattle grazing clover.

Pasture forage treatments included non-endophyte infected tall fescue, orchardgrass and soft-leaf tall fescue alone and with kura or white clover. The white clover treatment was measured only in 2006 due to severe winter damage the other years. Soft leaf fescue varieties were endophyte free.

Fescues and legumes stand out

The results from this study showed that when it comes to gain per unit of land, orchardgrass doesn't perform as well as endophyte-free fescues and legumes. In 2005, a very dry year, the animals on the tall fescue pastures had the highest gain per acre of all the treatments. Kura with soft-leaf fescue and soft-leaf fescue alone followed closely behind (see Figure 1).

Kura clover with soft leaf fescue pastures had the highest gain per acre in 2006. Tall fescue showed the second highest gains that year.

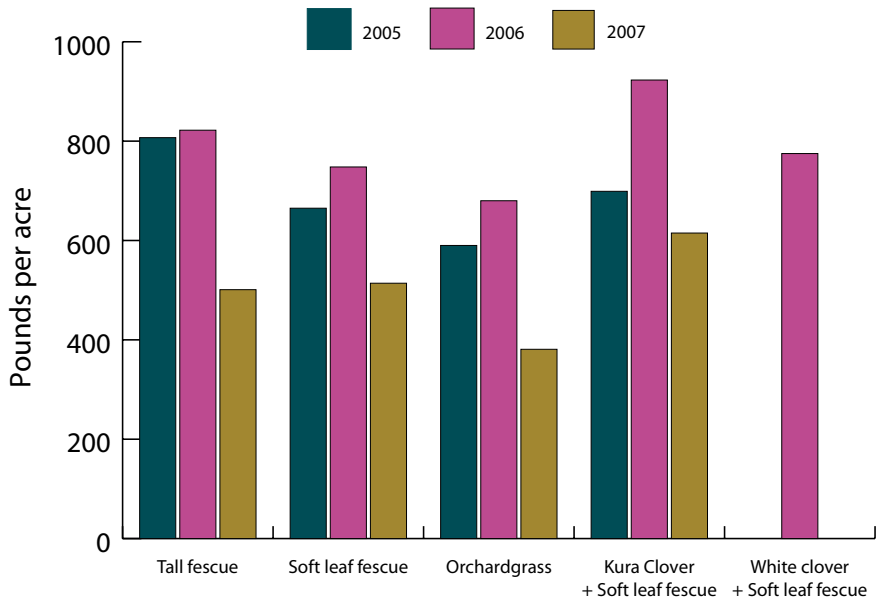
In 2007, production was lower than expected. A variety of small changes to the research explain these results: the researchers used higher stocking rates, the cattle were heavier at the beginning of the study, and the cattle did not receive an implant and were not managed as intensively for parasites as in previous years. Kura clover with soft leaf fescue provided the highest gain per acre again in 2007.

Orchardgrass showed the lowest gain per acre in all three years. Kura clover pastures with no nitrogen application produced a higher or similar amount of gain per acre as pastures of tall fescue and soft leaf fescue which received nitrogen fertilizer.

Holstein steers vs. beef cattle

Holstein steers gained as well as beef steers in 2005 and 2006, but Holstein gains were lower in 2007. Both steer types gained more than the beef heifers. Good Holstein steer performance in 2005 and 2006 demonstrates that these animals can work well in a grazing system. This is supported by nearly a decade of research from the UW-Madison Lancaster Agricultural Research Station that shows that Holsteins can achieve daily gains of 1.75 to 2.25 pounds on pasture alone. See CIAS Research Brief 76 at www.cias.wisc.edu for more information.

Figure 1. Animal gain per acre on different pasture treatments, 2005-2007



Beef cattle performance on pasture alone and with supplements

UW-Madison Center for Integrated Agricultural Systems

With or without feed supplements, it is possible to produce beef on pasture to meet commodity market specifications. More time is required to meet these specifications when diets are strictly forage based. These are the findings of a three-year study by UW-Madison researchers Dan Undersander of Agronomy and Jeff Lehmkuhler, formerly of Animal Sciences, with support from a USDA-CSREES HATCH grant.

Researchers measured performance of 48 steers each grazing season from 2005 through 2007 at the UW-Madison Lancaster Agricultural Research Station. They compared predominately Angus- and Hereford-sired crossbred beef steers to crossbred Normande steers. All four diets included pasture; one treatment was pasture only. Others included a supplement of alfalfa pellets; a supplement of soyhulls and dried distillers grains; and a supplement of soyhulls, dried distillers grains and an ionophore. Steers were offered up to 9 pounds of supplement per head daily, which provided an estimated 50 percent of each animal's daily dry matter intake over the grazing season.

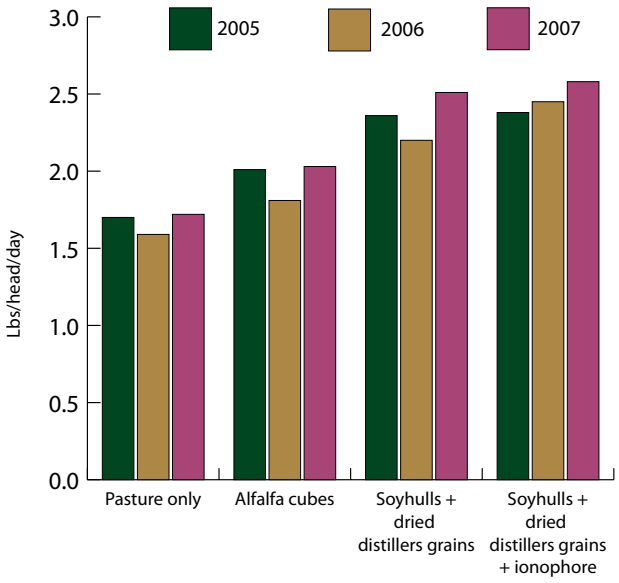
Electronic gates fastened to feed bunks allowed for all treatments to be offered in the same pasture area, reducing the impact of pasture type and quality on the responses from the supplementation strategies. Pastures were mostly a cool-season grass-legume mixture. Steers were moved to new areas of pasture three times weekly.

The target beef quality grade was Select or higher. For the commodity market, it is important to produce carcasses with sufficient marbling to attain at least a Select grade.

Rate of gain

Supplementation of all types increased daily gains for steers in all three years. The two soyhull plus dried distillers grains treatments had the highest daily gains. The inclusion of an ionophore significantly increased gain in only one of the three years. Alfalfa pellets increased daily gains by 0.25 lb/day compared to pasture only.

Average daily gain of steers consuming different supplements in a pasture finishing system



Carcass differences

Both treatments with soyhulls and dried distillers grains produced heavier carcass weights and higher dressing percentages. Ribeye area was larger for cattle on all supplements compared to the pasture only group. Most of the steers fed the soyhulls plus dried distillers grains supplements met the targeted levels of weight and backfat to be marketed directly off pasture at the Select or better grade. Steers on the pasture-only and alfalfa pellet treatments needed additional time to attain the Select grade weight and marbling. After 60 additional days, they were ready with minimal carcass differences compared to the earlier groups. Tenderness was not different among treatments.

Steers grazing pasture without any supplement produced beef of similar marbling to that of supplemented cattle. Only in 2007 was the average marbling score greater for the supplementation treatments compared with those from steers consuming pasture only.

A dry growing season in 2005 caused some animals to be removed from pasture in early October. The cattle did not have the degree of finish they should have and this was reflected by a low percentage of cattle achieving the target quality grade. However, in 2006 and 2007 more than 70 percent of the carcasses from the supplementation treatments graded USDA Select, Choice or Prime.

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Gildersleeve accepts UW-Extension grazing position

Managed grazing systems continue to be a growing management technology used in Wisconsin dairy and livestock production systems. UW Cooperative Extension Dean Rick Klemme worked with several grazing community stakeholders (USDA-NRCS; WI Department of Agriculture, Trade and Consumer Protection; Grazing Lands Conservation Initiative; Grassworks Inc.; local grazing networks and others interested in grazing research and Extension) to develop an Extension position responsible for statewide coordination of grazing Extension education and research efforts. A primary responsibility of this position is to act as a liaison to connect University grazing resources, education and research to the broad educational needs and issues of the grazing community. Rhonda Gildersleeve accepted the position of Grazing Research Specialist effective November 2008 on an interim appointment with partnership support between USDA-NRCS and UW Extension.

Rhonda's office is located at the UW Lancaster Agricultural Research Station, 7396 State Rd 35 & 81, Lancaster, WI 53813; phone: (608) 723-6243; email: rhonda.gildersleeve@ces.uwex.edu. Her initial program will focus on developing Extension resource materials and collaborative projects relating to management of pasture nutrients and animal nutrition, managing pasture legumes and residual dry matter relationships and other topics as needed in collaboration with CALS and US Dairy Forage Center colleagues. In addition, she will assist agency grazing specialists and local Extension agents with resources needed to answer dairy and livestock producer questions on grazing management and pasture production in collaboration with UW Extension Forage Agronomists Dan Undersander and Dennis Cosgrove as well as other Extension specialists.

Upcoming events

Jim Gerrish, American Grazing Lands Services, author of *Management Intensive Grazing—the Grassroots of Grass Farming*, will be the featured speaker at a series of meetings across Wisconsin in mid-March. For more information and to register, please contact the meeting coordinator listed below for the date you would like to attend.

March 10 Town & Country RC&D Grazing Meeting, Jefferson, Peter Pitts, 920-541-3208

March 11 Heart of WI Grazing Conference, Wausau, Paul Daigle, 715-261-6006

March 12 Stetsonville Grazing Conference (daytime), Bob Brandt, 715-748-2008

March 12 North Central Graziers Network, Ladysmith (evening), Bob Brandt, 715-748-2008

March 13 West Central WI Grazing Conference, Eau Claire, Brian Brezinski, 715-579-2342

March 14 NW WI Grazing Conference, Spooner, Otto Wiegand, 715-635-3506

March 17 SW WI Winter Grazing Meeting, Boscobel, Gene Schriefer, 608-935-0391

Beef cattle performance *... from page 8*

Normande steers

Normande and beef crossbred steers performed similarly in each treatment. In all three years, the Normande carcasses had higher dressing percentages and less backfat than the beef breeds, as would be expected of a dairy-influenced breed. Lower marbling scores for the Normande crosses was an unexpected finding and may be explained by the fact that the Normande steers were a month younger and were lighter than the beef steers at slaughter.

Tradeoffs

Supplementation on pasture makes it possible to meet commodity market targets for Select or better grades more quickly than pasture only. Whether this is an economic advantage depends on the producer and the farm in question. With growing interest in grass-fed and grass-finished beef, some farmers may prefer not to supplement their cattle and sell beef directly to consumers. Supplementation is also a way to stretch pasture, especially during a summer slump in pasture growth. See CIAS Research Brief 77 at www.cias.wisc.edu for more information.