Volume 4, Number 3
May-June 1999

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GLCI News

Grazing Lands Conservation Initiative

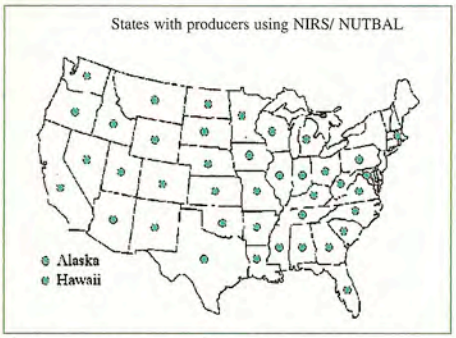
The Grazingland Animal Nutrition Lab:

Monitoring the Nutritional Well-Being of Free-Ranging Animals with the NIRS/NUTBAL System

By Doug Tolleson, Texas A&M University GAN Lab,
Assistant Director

Grazing animal performance is primarily determined by plane of nutrition. When sound management is applied, the nutritional needs of an animal using a particular forage resource can be met or exceeded. Circumstances such as drought, winter, or overstocking can cause forage quality or quantity to fall below critical thresholds for animal maintenance or economically sustainable production. When these situations occur, supplemental feed is required.

Purchased supplemental feed is often the greatest input cost associated with producing a unit of milk, meat or fiber. Determining what to feed, when to start, how much and for how long are some of the critical choices a livestock producer faces. While farmers routinely apply soil amendments after receiving a detailed chemical analysis, livestock producers often rely strictly on experience and estimation to make nutritional management decisions.



Diet quality of grazing animals is difficult to determine. Mistakes are costly. Even with a high level of expertise, making these decisions in the midst of erratic weather and market conditions is a difficult task. Accurate, timely, and cost-effective information on the nutritional status of grazing animals would be a great benefit to livestock and /or

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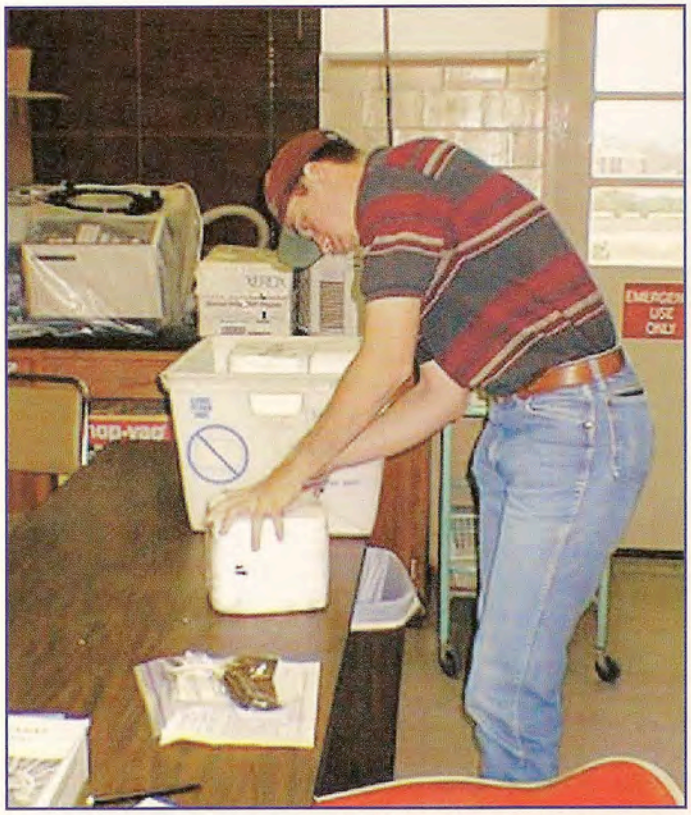
Cover photograph: Orchardgrass and tall fescue under loblolly pines. A good example of silvopasture in northwest Georgia. Proof that high quality forage and trees are compatible.



Jason Hohlt unpacks livestock samples from styrofoam containers.

The Grazingland Animal Nutrition Lab

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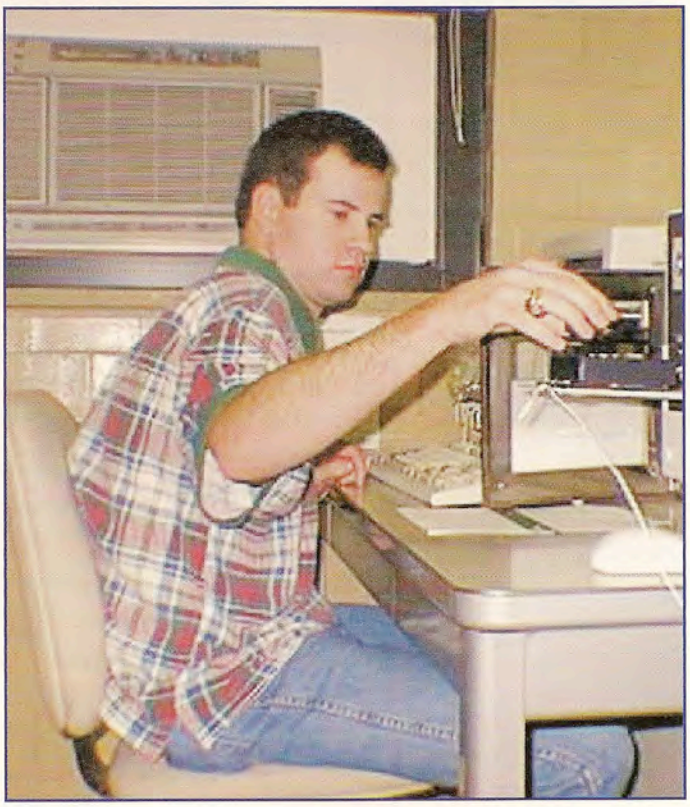
resource managers. The NIRS/NUTBAL system was designed to provide this information in a non-invasive and time-efficient manner.

Near infrared reflectance spectroscopy, or NIRS, is the diagnostic component of this system. Fresh fecal material is collected from a representative sample of the herd or flock in question and sent to the Grazingland Animal Nutrition (GAN) Lab. There, it is dried and ground to a uniform particle size. In the next step, light from the near infrared band is projected into the sample. Just as light in the visible spectrum is absorbed or reflected uniquely by distinct materials resulting in our perception of color, NIRS "sees" the wave lengths reflected and absorbed by the fecal sample. The nutritional makeup of the diet will result in a particular chemistry in the feces. Mathematical equations derived from comparing known diets and corresponding fecal samples are then applied to predict diet quality.

Values for crude protein and digestible organic matter (energy) obtained by NIRS are used in the Nutritional Balance Analyzer, or NUTBAL, software package. The user inputs such variables as breed type, reproductive state, and peak milk yield of a representative animal. Environmental conditions and performance goals are also included. These factors determine the nutritional requirements of that animal. NUTBAL then determines if the predicted diet is sufficient to meet these needs. If a deficiency is detected, the user can then choose feedstuffs and formulate a least-cost feeding program in NUTBAL to rectify the shortfall. Clients can either purchase and use NUTBAL themselves or request that GAN Lab run the analyses for them.

Producers in 44 states are involved in the NIRS/NUTBAL fecal monitoring system. They are either participating on their own or in cooperation with state extension agencies, feed companies or the NRCS. This system is also being applied in Canada, South America, and Africa. Most clients use the service to make nutritional management decisions for domestic livestock (cattle, sheep and goats), however, deer, bison and elk diets can also be predicted. Future plans are to expand the realm of fecal NIRS analysis to include other species, additional diet constituents, and improve the robustness of existing equations in specific situations.

Jeff Wellman reads fecal samples with the NIRS machine.



Broiler Litter Does Double Duty for West Virginia Farmer

By Rex Gardner, Mt. Clare, WV

Tom Porter is a firm believer in the value of poultry litter. He owns and operates a 246 acre farm in Doddridge County, WV. During the summer, Porter feeds the litter free-choice and each animal consumes 3 to 7 pounds per day while they are grazing. In winter, consumption per animal can be as much as 28 pounds per day. In the month prior to calving, corn is added for energy at a ratio of 90:10 litter to corn. Weight gains on calves have been impressive. His 205 day average gain for steers and heifers combined is 2.26 pounds per day.

Feeding poultry litter all year has helped Porter improve his operation in other ways:

- **Reduced mineral supplement by 75%.**
- **Eliminated dragging fields to spread manure – manure is thinner, dissipates rapidly, and is spread by turkeys and crows.**
- **Increased length of grazing season.**

Litter also serves as an alternative to reduce dependence on commercial fertilizers. The lab analysis on broiler litter indicates these nutrient levels per ton of litter:

- **Nitrogen 48-52 pounds**
- **Phosphorous 58-63 pounds**
- **Potash 44-56 pounds**
- **Calcium 300-500 pounds**

Porter said that with a 2.5 ton per acre application rate at a cost of $20 per ton, it is more economical for him to use litter than commercial fertilizer. However, he points out that he soil tests his pastures regularly. If the soil does not need phosphorus or potash, using litter instead of commercial fertilizer may not be cost effective.

Calibrating the poultry litter spreader on the Porter Farm.

This field on the Porter Farm was fertilized with poultry litter at the rate of 2 tons per acre.

His goal is to produce an orchardgrass/clover hay yield of 6 tons per acre. In 1996 he harvested 5.3 tons per acre and was able to graze the same area late in the season. With favorable weather conditions, he feels that he can achieve his 6 ton per acre goal.

Some benefits Porter attributes to using litter on his hayland are:

- **Plants have wider leaves and grow faster.**
- **More diversity in hay fields – new plants are present.**
- **Value and quality of hay have increased tremendously.**

> ***"In our operation, we figure hay at 2 ½ cents per pound for all costs, and litter at 1 cent per pound. We can feed litter on pasture and receive the benefits of knowing that the cow has available to her all she needs in the way of mineral and protein, with an added package of manure quality. The manure she passes is twice the value in plant nutrition as straight grass manure." – Tom Porter***

Benefits of litter on pastureland mentioned by Porter are:

- **Increased availability of forage by 30 to 35%.**
- **Cattle are satisfied quicker and spend less time grazing.**
- **Weeds grow faster, but most of them are grazed quickly by cattle.**
- **Eliminated costs and risks of clipping pastures.**

Porter also recognizes some potential disadvantages to using poultry litter:

- **Transportation costs if supply is not available nearby.**
- **Manure spreader had to be modified to spread litter at a lower rate.**
- **Loader is needed to move manure from pile to spreader.**
- **Spreading litter on sloping terrain is time consuming and can be dangerous.**
- **Many producers and others have negative attitudes about feeding litter.**

Mr. Porter has shared his economic data with the NRCS field office in Mt. Clare, WV. For more information, contact them at 304/624-7211.

Related Publications and Informational Materials Available:

Working Trees for Livestock
Developed by the National Agroforestry Center
Contact Nancy Hammond at 402/437-5178 ext. 11 or Diane Johnson at 817/509-3212

Rangeland Monitoring Manual
Compiled by Douglas A. Reynolds, University of Wyoming Cooperative Extension Service. Contact Doug Reynolds at UW Cooperative Extension Service Laramie, WY 82071-3354

Grazing Lands Enterprise Diversification
Developed by USDA-NRCS Grazing Lands Technology Institute
Contact Diane Johnson at 817/509-3212

Reference Guide for Texas Ranchers, publication L5097
Developed by Allan McGinty, Texas Agriculture Extension Service
Contact Texas Agricultural Extension Service

Preserve and Protect South Carolina's Grasslands
Developed by South Carolina Grasslands Coalition
Contact Michael Hall at 864/388-9163

Oklahoma's Grazing Lands-Important to YOU and the Enviroment
Developed by Oklahoma Coalition for Grazing Lands Conservation Initiative. Contact Steve Glasgow at 918/341-3241 or Dwain Phillips at 405/742-1243

Nebraska Grazing Lands
Developed by Nebraska Grazing Lands Coalition
Contact Kim Stine at 308/532-7100

A Texas Treasure-Conservation of Private Grazing Lands
Developed by USDA-NRCS, Texas State Office
Contact Harold Bryant at 254/742-9811

L to R: SSgt. Robert Chambers and SSgt. Michael Reed at Desert Warfare School in Nevada.

GOOD LUCK, MIKE!!!

Michael Reed is the editorial assistant for *The Louisiana Cattleman* magazine and publication coordinator for the *GLCI News*. He is the guy that puts our newsletter together, coordinates the printing, and distributes the newsletter.

Mike is going to be on temporary foreign assignment for a little while. Mike is a Staff Sergeant in the 159th Security Police Squadron in the LA Air National Guard. He volunteered for a 30-day tour of active duty in Kuwait. The good news is that Mike will be back in time to get our July-August issue ready for publication. Take care Mike. See you when you get home.

Reminder!!

The National GLCI Steering Committee is conducting a logo contest. Entries must be received by July 1, 1999. Winner receives a trip for 2 to the National Grazing Lands Conference in Las Vegas. Send entries to Gary Westmoreland, 101 S. Main St., Temple, Texas, 76501-7682.

GLCI News

Contact these affiliated organizations:

American Farm Bureau Federation
Herb Manig
(847) 685-8785

American Forage and Grassland Council
Dana Tucker
1-800-944-2342

American Sheep Industry
Tom McDonnell
(303) 771-3500

Dairy Industry
John Roberts
(802) 462-2252

National Association of Conservation Districts
Robert Toole
(405) 359-9011

National Cattlemen's Beef Association
John Pemberton
(202) 347-0228

Society for Range Management
Craig Whittekiend
(303) 355-7070

Soil and Water Conservation Society
Craig Cox
(515) 289-2331, ext. 13

Visit the GLCI homepage at http://www.glci.org