
Profitable & Sustainable AGRICULTURAL SYSTEMS
UW Cooperative Extension Service

UNIVERSITY OF WYOMING

# UW extension initiative team offers educational resources

*By Wayne Tatman, University of Wyoming Cooperative Extension Service Goshen, Laramie, and Platte counties*

***Wayne Tatman***

The University of Wyoming Cooperative Extension Service's Profitable and Sustainable Agricultural Systems (PSAS) initiative team helps provide Wyoming residents a variety of educational resources.

This *Barnyards and Backyards* newspaper insert is one example of sharing educational resources and information. This effort addresses issues relevant to people in production agriculture and will be distributed in more than 19 Wyoming newspapers. Another newspaper insert addressing issues of importance to a more urban clientele and small acreage owners will be distributed through newspapers in urban areas of Wyoming this spring. Another audience is being targeted with a one-page layout in the *Wyoming Livestock Roundup* each month with articles about livestock and crop production.

The team helped plan and conduct the "Keeping Wyoming Safe and Secure Conference," an in-depth training in December on preparation to prevent agroterrorism. More than 75 local, state, and federal agency representatives attended from the state and region.

The PSAS team has been busy presenting the educational program "Insuring Success for Wyoming Agriculture" throughout the state with special emphasis on forage-based livestock systems and sustainable cropping systems. The livestock-based programs were held in Evanston, Rawlins, Lander, Cody, and Buffalo, while the crops and irrigation programs are planned for Pine Bluffs, Casper, Riverton, and Powell starting the week of March 13th. Alternative fuels, irrigation efficiencies, and managing risk within the agricultural operation will be discussed. Times and locations can be found by accessing www.insuringsuccess.org and click on the Insuring Success for Wyoming Agriculture for Crop Producers link.

The needs of the homeowner continue to be addressed in each county through individual home and garden consultations, a statewide effort through the weekly horticulture series "From the Ground Up" for K2 Television in Casper, an active Master Gardener program in several counties, and a special effort to address issues facing exurban and small acreage owners with innovative information delivery methods, such as the creation of magazines like *Barnyards & Backyards* (http://barnyardsandbackyards.com/). Exurban refers to areas outside cities and towns that are neither urban nor suburban.

This is a sampling of educational efforts offered by the PSAS initiative team whose goal is to provide research-based information to assist producers in sustaining their operations.

To learn more, contact me, the team vice chairman, at (307) 532-2436 or wtatman@uwyo.edu, or your local CES educator.

# Research shows importance of colostrum throughout calf's life

*By Steve Paisley*

We all know it is important for a calf to receive colostrum, which is rich in energy, nutrients, and maternal antibodies.

Recent studies have measured just how important adequate colostrum intake is. Research at the U.S. Department of Agriculture's Roman L. Hruska Meat Animal Research Center near Clay Center, Nebraska, evaluated several calves, dividing them into two groups based on the amount of colostrum received. Calves receiving little or no colostrum were six times more likely to get sick in the first month of life (i.e. scours). They were also five times more likely to die before weaning and three times more likely to get sick in the feedlot. Recent studies stress the lifelong impacts of inadequate colostrum.

***Steve Paisley***

## Maximizing the benefit from colostrum

Several things can maximize the chances of a calf getting adequate colostrum intake. The first is making sure the cow is in good condition prior to calving and feeding a ration that supplies adequate energy and protein at calving. Good nutrition also improves calf vigor, which means the calf will stand sooner (timing of colostrum intake is important), and be more aggressive in chasing down the mother to nurse. Another important part of this equation is on the dam side. Adequate nutrition helps maternal production of colostrum. Additional dam considerations include having a cow with good maternal instincts, temperament, and udder conformation.

If getting colostrum into the calf the "natural" way fails, there are several options. Avoid feeding milk or electrolytes first. They will reduce the absorption of antibodies if colostrum is fed later. Frozen colostrum from another cow in the same herd is the best possible replacement for the calf. Thawing at room temperature or in a warm-water bath is important. Avoid heating colostrum in a microwave. Getting the colostrum into the calf in the first 12 hours is important for adequate absorption, and calves also tend to get better absorption if they receive the colostrum through a nipple rather than a drench tube. Finally, commercial powdered colostrum replacements don't pack the same punch as the real thing, but they are definitely better than nothing.

## Impacts of herd health on subsequent performance

Probably the most interesting research information is the impact of colostrum intake on calf health if ownership is retained through the feedlot. Several studies document the effect of sickness in the feedlot. By adding up additional veterinary bills, reduced performance, lighter finish weights, and poorer quality, feedlot sickness results in an average "cost" of $88 per head.

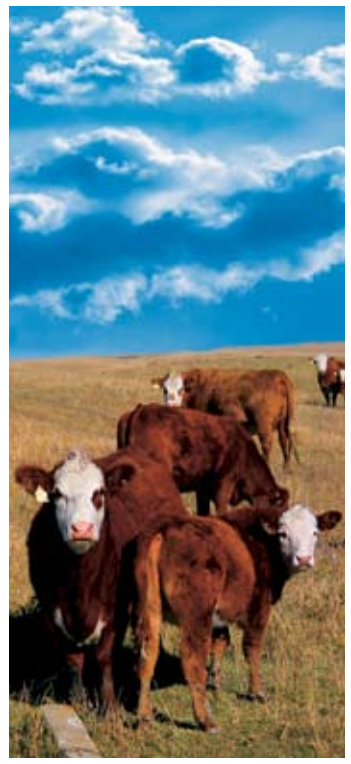
Researchers continue to see relationships between early nutrition and management and subsequent production. Research at the University of Wyoming's Department of Animal Science is focusing on the importance of nutrition of the dam to fetal development and whether or not this affects the future health and performance of the offspring. Does colostrum intake affect cow longevity? Current studies are getting closer to answering these questions.

## Impact of wind on immune transfer and calf immunity

The impact of wind on calves is often overlooked. Colostrum intake is affected by both the amount of colostrum produced by the cow (previous nutrition and management) as well as how much and how quickly the calf nurses after birth. We have measured the immunoglobulin type G (IgG) levels in calves at UW finding that, even though we closely manage cows during calving, we still have approximately 40 percent of our calves with low (below 8.0 mg/ml) IgG levels. IgG is one of the immune antibodies that calves receive passively (via colostrum) from their mother.

Our own findings have made us reevaluate how we manage during calving and the importance of double-checking to make sure calves are up and nursing.

Calf levels of IgG can basically be influenced by two things: 1) the amount of IgG produced by the cow. A thin cow often won't produce as much colostrum and therefore not as much antibodies as a cow in good condition and good health; and 2) the ability of the calf to nurse the cow during the first 12 hours after birth. Good weather, good nutrition, and good management (i.e. adequate protection from the cold and wind) should



allow the calf to get up, nurse several times within the first 12 hours and get a maximum amount of colostrum. Weak calves, difficult births (called dystocia), and lack of protection from the wind can influence calf vigor, or his "desire" to get up and nurse quickly after birth.

Wind and cold are a fact of life for cow herds in this region. Windbreaks and shelters can dramatically reduce the effect of wind on a herd. Consider wind direction when feeding, placing bunk lines and shelters, adjusting feed during cold and windy spells to match requirements, and providing and moving bedding areas. All are considerations that will positively affect the herd.

*Steve Paisley is a UW Cooperative Extension Service beef cattle specialist and assistant professor in the Department of Animal Science. He can be reached at (307) 766-5541 or spaisley@uwyo.edu*

# Successful tree and shrub planting strategies

*By Tom Heald*

It isn't easy growing trees and shrubs in Wyoming – one look at the prairies suggests that trees and shrubs aren't in the cards! But residents can grow trees and, to make the effort worthwhile, the University of Wyoming Cooperative Extension Service has developed an action plan consisting of seven planting strategies.


***Mulches reduce water loss, keep soil temperature moderate, and allow for good root development.***

***Lawn trimmers and lawnmower damage can cause long-term damage to trees. Keep grass and weeds away from trees by applying a mulch.***

1. Location, Location, Location! This real estate term says it all when determining where to plant a tree or shrub. Never plant trees within 20 feet of a home or outbuilding. Shrubs should be kept at least five feet away. No matter how small they are when planted, trees grow up! They can interfere with the integrity of a foundation, and the long-term health of the tree can be compromised. As corny as this sounds, look up before planting! If there are utility lines above the planting site, move the tree. In 10 years this will pay off. Wind is a serious problem for most of Wyoming, and planting locations should be carefully considered so snow drifting won't become an issue.
2. Site Preparation. Prepare the planting site by spading or rototilling an area at least two times the diameter of the root ball (example: if the root ball is 2 feet across then the area to be tilled will be 4 feet). Dig the hole only as deep as to the top of the root crown – the area on a tree where the roots start to grow. Planting deeper may result in the death of the tree. It is much better to err on planting too shallow than too deep!

***Poor placement of these junipers has made winter travel impossible on this country lane.***

3. Amend the soil? The research is fairly clear – don't! That is, adding peat moss or aged manures into the planting soil mix provides no long-term benefit to the trees. Research has shown that in some cases this can actually hurt trees' ability to survive and flourish.
4. Remove all man-made items from the root ball. Things like wire, burlap, and string need to be removed once the tree is in place but before backfilling begins. If left in place, these materials can cause severe root girdling.
5. Watering. Think in thirds! After a tree is planted, backfill the hole with soil until it is about one-third full and then add water. Adding water helps eliminate any air pockets. Make sure all the air pockets are filled in with the water. Continue this process until completed, but don't tamp the soil. Air pockets should be eliminated without compacting the soil.
6. Fertilizing. It seems natural to add fertilizer to a newly planted tree. After all, that's the common strategy in the garden. But in practice, adding fertilizer to a newly planted tree can actually harm it! The tree needs to adapt to its new site, not produce a crop. Unlike a tomato plant that may get a full dose of fertilizer, a tree has many more years to grow and produce. In general, one can begin to fertilize trees in the first or second year following planting, typically in late May or early June. A soil test done with the assistance of a UW CES office will help determine what a tree's fertilizer requirements are.
7. Mulching the tree area. Next to proper planting depth, mulching is one of the most important steps to ensure survival of trees and shrubs. Use a coarse-textured mulch like wood chips, bark, or rock. Usually, wood mulch is preferred, but in high-wind areas, pea gravel to fist-sized rocks is recommended. Mulch does extraordinary things like allowing for longer retention of soil moisture from the drying effects of the sun and wind. By applying mulch to the surface, water usage can be cut up to 75 percent. Mulch reduces the compaction of soils around a tree, allowing roots to grow easily into the soil. It also keeps soils cooler in the summer and offers insulation in the winter. Mulch also helps keep grass and weeds away from trees, eliminating potential damage caused by trimmers and lawn mowers.

*Tom Heald is a CES educator in Natrona County and can be reached at (307) 235-9400 or theald@natronacounty-wy.gov.*

# Producers may increase profits growing organically certified products


*Brett Moline*

*By Brett Moline*

Most producers are looking for ways to increase net income. One possible consideration is through organic production.

The U.S. Department of Agriculture's National Organic Program (NOP) standards and guidelines details certified organic production. Some consumers will pay as much as 200 percent more for certified organic products, including hay and meat.

The NOP can be accessed on the Web at www.ams.usda.gov/nop/indexie.htm.

What does it take to become certified? Many producers are closer than they may realize. The guidelines state no man-altered chemicals can be used unless listed as acceptable in the regulations. All natural inputs can be used unless listed as unacceptable. If a producer's records show they have not performed any non-allowed activity for three years prior to harvest, that crop could be certified. Cows need to be managed organically at the beginning of the third trimester of pregnancy for the calf to be certified organic.

Not fertilizing and not treating weeds will bring producers very close to the crop being certifiable organic. So, too, if calves are not implanted with growth hormones or even treated at sub-therapeutic levels of antibiotics.

Producers must have a business/production plan concerning production and marketing practices to become certified organic. A producer needs to outline how production practices will maintain or improve the natural resource. For example, how will weeds be managed? Will the producer fertilize and, if so, what organic fertilizer will be used? What steps will a producer take to ensure no commingling of their organic production with conventional production? This becomes extremely important if the producer will be producing under both.

Producers should conduct research before deciding if organic production will increase net income.

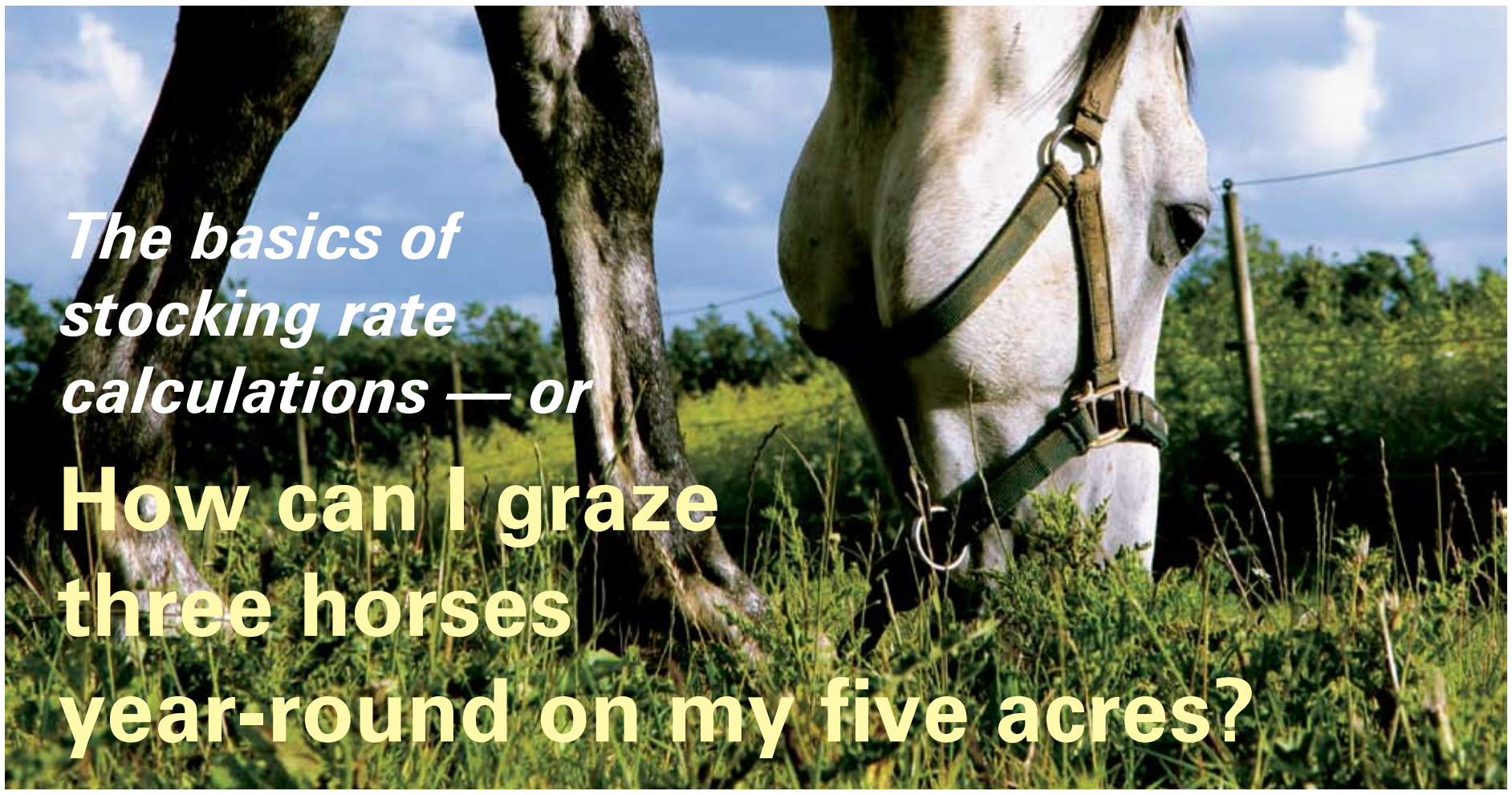
Becoming certified as an organic producer will cost at least $2,000, which includes inspections to ensure the producer is following organic guidelines. Changes in production and production costs must be identified. Dependable outlets or markets for production must also be found.

Organically produced items can be marketed as conventional production, which assures producers a floor price – the price received for general commodities.

The main question a producer must answer is, if production costs increase under organic production, will the price received cover the additional costs?

For help answering this question or for more information concerning organic production, contact a local CES office. County offices can be accessed at http://uwadmnweb.uwyo.edu/UWces/Counties.asp.

*Brett Moline is a CES educator for Albany County and can be reached at (307) 721-2571 or bmoline@uwyo.edu*



*The basics of stocking rate calculations — or*

# How can I graze three horses year-round on my five acres?

*By Gene Gade*

Estimating the carrying capacity or sustainable stocking rate of a pasture must begin with understanding some very basic rules:

**Rule #1: Forage production must be greater than or equal to forage demand.**

This rule is right up there with the principles of physics identified by Newton, Einstein, Planck, et al. If consistently violated, the system will crash, and both plants and grazing animals are likely to suffer – critters could starve, and the little piece of heaven could quickly turn into a dusty, highly erodible weed patch. What's biologically possible in Big Wonderful Wyoming?

## Forage Production:

**Rule #2: Rangeland pasture production is inconsistent and dependent upon many variables.**

Two variables are probably most important in determining forage production: precipitation and the composition and health of a plant community. Soil depth and texture, topography, and grazing management are also very important. In large pastures, distance from water and steepness of slope are significant.

**Rule #3: Wyoming is semiarid, and drought happens.**

Average precipitation in Wyoming varies from 5 inches per year to more than 20 inches depending on location, elevation, etc. Precipitation also varies in distribution and form. In eastern Wyoming, much of the precipitation comes in the spring and early summer in the form of rain or wet snow. In the western part of the state, a greater percentage of the annual moisture comes in the winter, often in the form of snow with lower water content. Both of these patterns favor the so-called "cool-season grasses," which generally reach their peak of production before the end of June.

Other things being equal, forage production can vary more than 300 percent between wet and dry years. Below-average precipitation years are occurring more frequently in Wyoming. In this context, relatively conservative stocking rates make sense as does an alternative feeding plan.

**Rule #4: Vegetation type, range site, and condition affect production.**

Native range is more diverse but often produces somewhat less forage than introduced seeded grasses; however, all plants are limited by biological and environmental constraints.

Site characteristics, such as soil depth, texture and chemistry, and topography are very important. For example, a relatively level pasture with a deep, well-developed loam soil usually produces more forage for livestock than a pasture with steep slopes and high runoff, or a shallow, rocky, or strongly alkaline soil.

The "condition" of the pasture relative to its ecological potential is significant. A pasture dominated by healthy perennial grasses, for example, will supply the needs of cattle and horses better than one dominated by downy brome (cheatgrass), tumble weeds, or unpalatable/toxic plants. With the same precipitation amounts in the following example, a pasture in "high-good" condition would produce twice as much forage as the same pasture in only "fair" condition (at 1,500-pounds/acre/year vs. 750 pounds/acre/year).

**Rule #5: Take Half — Leave Half.**

Health and production of grazing animals is dependent upon the health and production of the forage plants. Plants produce food via photosynthesis for their own food supply. They need a certain amount of carbohydrates, fats, proteins, minerals, etc., just as animals do. If one is lucky (with favorable weather, etc.), plants will produce a surplus of nutrients, some of which can be safely "harvested" by plant-eating animals. The needs of the plants must be protected to keep the whole system healthy and sustainable. Abundant research has established that, in a normal year, plants need to keep about 50 percent of their tissue, especially their leaves, to produce the food needed to stay healthy. True, given available moisture in the soil and an adequate period to "rest" and recover, grasses can recover from more severe defoliation; however, the generalization holds for most pasture situations – take half for the animal, leave half for the plant.

When grazing consistently removes too much leaf material, the root system of the grass is depleted, making the plant less competitive for limited soil moisture and less able to regrow leaves or tolerate drought. When plants are over utilized, the range is opened up to erosion and/or to less desirable competitive plants. It's a downward cycle. The poor get poorer.

It's hard to determine what constitutes a 50-percent harvest of diverse vegetation. Many range scientists now recommend managers use "stubble height" as a measure of utilization. The permissible level varies some with species, but a good rule of thumb is to leave a stubble about 4 inches high to maintain the health of most grasses.

**Rule #6: Some forage is lost to other consumers.**

One should not assume that all of the forage that disappears has been eaten by domestic animals. There are thousands, nay, billions of other consumers on an acre of pasture. These range in size from microbes, to insects, to mice and gophers, to antelope, deer, and elk. Some forage gets trampled into the dirt or blows to the next county. Some decomposes. A lot is eaten by grasshoppers, weevils, and such.

Research has shown that, on most pastures, 15 to 25 percent of forage is lost in these ways. Intensive grazing management (high intensity for short durations) can increase harvest efficiency, but even then there are losses. In most season-long grazing situations, harvest by domestic livestock is only about 25 percent.

*Continued on Page 5*

*Continued from Page 4*

### Forage Consumption – the other side of the equation

The amount of forage consumed by grazing animals is based on their digestive systems, their body weights, their reproductive and work status, and their behavior.

In general, ruminant animals (cattle, sheep, antelope, deer, elk, etc.) consume dry-matter forage equivalent to about 2 percent of their body weight per day. So, a 1,000-pound cow would normally consume about 20 pounds of feed per day (on a dry-matter basis), and a 150-pound sheep would eat about 3 pounds of dry matter per day.

Horses, partly because their digestive system is less efficient, normally consume forage dry matter at the equivalent of 3 percent of their body weight per day. Thus, a 1,200-pound horse often consumes about 36 pounds of dry forage each day if it's available.

It's also important to note that most forages rapidly lose nutritional value as they flower and go dormant. There is an optimal grazing period for most grass species, and grazing animals need more than dry matter. Therefore, supplementary nutrients are essential on nearly all pastures for at least part of the year. Knowing these things about forage production and animal consumption, it is possible to estimate the carrying capacity and/or sustainable stocking rate for pastures.

*Gene Gade is a University of Wyoming Cooperative Extension Service educator in Campbell, Crook, and Weston counties. He can be reached at (307) 283-1192 or agade@uwyo.edu.*

## DOING THE MATH: AN EXAMPLE

**(Please understand that pastures are unique, and your conditions are likely to be different)**

### Assumptions:

Northern Great Plains native range pasture (5 acres);

11- to 14-inch precipitation zone;

Loamy range site (loam soil greater than 20 inches deep);

Low-good range condition;

Predicted annual plant production is about –

- 1,300 pounds per acre in a favorable precipitation year,
- 975 pounds per acre in an average precipitation year,
- 360 pounds per year in an unfavorable precipitation year;

A 1,200-pound horse eats 36 pounds of dry matter per day.

Five acres of this example pasture in an average year would produce about 4,875 pounds of forage (975 pounds of forage per acre multiplied by five acres equals 4,875 pounds of forage). Half must be left to keep the plants healthy, and 15 percent is lost to other consumers. Therefore 35 percent is available for domestic grazers (4,875 pounds available multiplied by .35 equals about 1,706 pounds available to domestic grazers.)

This pasture can provide for the dry matter requirement of a single horse for about 47 days or three horses for about 16 days (1,706 pounds available forage divided by 36 pounds per day consumed by one horse equals 47.4 days forage available.)

For a six-month (183-day) grazing season, a horse would need about 6,588 pounds of dry matter and about 19 acres of the example pasture to provide it. Three horses of the same size would need three times that much feed and/or acreage for half a year.

Clearly, five acres of the example pasture cannot sustain even one horse for the long haul. The pasture must be rested, and alternative feeds must be provided.

This example dealt with horses and small pastures, but the same principles apply to larger pastures and other grazing animals.

# GRP Rangeland Insurance Program:

## *A new risk management option for livestock producers*

*By James Sedman and John P. Hewlett*

Crop insurance products provided through the federal crop insurance program provide essential risk-management tools for a wide range of agricultural producers.

Crop and forage producers can take advantage of many insurance options to manage price and production risk. Livestock producers in Montana and Wyoming may not realize a new group insurance policy is available to help manage risks associated with grazing forage and rangeland. The Group Risk Plan (GRP) Rangeland Insurance Program was offered in a limited number of counties in Wyoming and Montana over the last two years and is now offered over a larger area in these two states.

### The 2006 GRP Rangeland Program

GRP Rangeland Insurance provides livestock producers who rely on grazed forage an affordable insurance option. Recent years of drought have shown how important this program could be in reducing the impact of decreased rangeland forage production. The program has been expanded to 39 Montana and 10 Wyoming counties (for a complete list of counties, visit the Risk Management Agency (RMA) on the Web at www.rma.usda.gov/pilots). Click on Pilot Program Training, then GRP Rangeland, then 2006 Pilot Program Overview. GRP Rangeland Insurance is similar to other federal crop insurance products as a county-based, group insurance policy. Forage yields are estimated from non-irrigated hay production for a county, including an indemnity trigger yield determined by RMA.

Producers are required to enroll for coverage by September 30 of the crop year. Premiums vary by the selected coverage, so consult an insurance representative for current rates.

### How GRP Rangeland Works

GRP Rangeland Insurance is a group insurance policy. This means producers do not have to maintain individual yield records or maintain an actual production history yield as with other types of crop insurance products. The county is classified as a group, and the rangeland forage production estimate for the group is the total non-irrigated hay produced in that county. If the total production is less than the indemnity trigger yield determined for the county, then an indemnity payment is made based on each producer's yield election (from 65 percent to 90 percent of the trigger yield). A producer selects the number of acres to insure and yield and price elections. The yield election is the percentage of the county trigger yield, and the price election is the percentage of the determined county base revenue per acre. Both the county yield and revenue are estimates determined from the U.S. Department of Agriculture's National Agricultural Statistics Service statistics for the county. An indemnity payment is made to the producer if the county hay production drops below the trigger level.

### Benefits of GRP Rangeland Coverage

Operations of all sizes can benefit from the coverage provided by range insurance. Most importantly, this coverage can provide a safety net where little coverage was available before. The last two years of pilot programs have shown that this coverage can provide substantially higher indemnities for fewer premium dollars than other available policies, such as catastrophic coverage or non-insured crop disaster policies. Costs for producers utilizing range insurance are lower both in terms of actual premium costs as well as paperwork and other record-keeping requirements. Another benefit is that the claim process is greatly simplified compared to other insurance plans. RMA determines if the group suffered an indemnity based on county numbers, so no individual yield appraisals are required.

Changes to the pilot program make indemnity payments more likely for producers if a decline in non-irrigated hay production occurs. This is because total non-irrigated hay production is used and not per-acre yields, which do not fully reflect the effect of abandoned acres. Using total production provides a better picture of total hay production for a county, making it more likely in the event of a natural disaster, such as drought, that an indemnity will occur.

For more information, or to determine if GRP Rangeland Insurance is offered in your area, consult a local crop insurance agent. For more information on this and other risk management topics on the Web, please visit the Western Risk Management Library at http://agecon.uwyo.edu/RiskMgt

*James Sedman is a consultant to the UW Department of Agricultural and Applied Economics, and John P. Hewlett is a farm/ranch management specialist in the UW Department of Agricultural and Applied Economics.*

# The scoop on handling manure

*By Hudson Hill*

One reason many people move out of metropolitan areas to rural settings is for the opportunity to own and raise livestock. One of the responsibilities of owning livestock is manure management.

Handling animal waste is often an unforeseen management problem that eventually turns into a readily seen problem. The first step in handling animal waste is to have a plan. If done correctly, it is good for both the property and the environment; if handled incorrectly, it could be bad for both. The landowner wants to improve soil quality, avoid pollution, and protect the productivity of the vegetative material.

The majority of livestock owners use one of two management systems. The first is to allow animals to graze full time. The manure is not collected or treated. The grazing system should be managed with some type of cultivation process to incorporate manure into the soil and help decomposition. This will also break up manure piles and expose parasite eggs to the environment. When combined with well-planned grazing management, the system works very well.

The second system is a confined system in which the manure is stored and then mechanically applied onto the land.

This system is managed in one of the following ways:

1. Manure is stockpiled for use in the future. An adequate storage facility gives flexibility to manure application timing.
2. Manure is composted to be applied at a later date. Composting produces a dryer end product that is much easier to use.

***Hudson Hill***

3. Manure is removed and applied daily.

The next four items should be considered when planning a strategy:

1. **Storage:** A 1,000-pound horse will produce up to nine tons of manure a year. Questions to ask when planning storage of manure: Will there be enough room? Will the storage facility be environmentally safe from water runoff, filtration, or other means?
2. **Equipment:** How will the material get into storage and then from storage to the field? When applying manure to a landscape, consistency is the key. Soil tests and nutrient analysis should be done on manure to know when, where, and how much to apply. With manure, like all things, you can get too much of a good thing.
3. **Time and ability:** Will the storage and application process in the management strategy actually get done?
4. **Funds available:** How much will the management strategy and facility cost?

The positive aspects of adding manure to soils are numerous. An excellent soil fertilizer contains nitrogen, phosphorous, and potassium. The nitrogen contained in manure will be slowly released as the plant material breaks down in the soil. In addition, manure is a wonderful soil amendment adding organic matter that will increase the soil's ability to hold water. Kelli Belden, a soil scientist with the Department of Renewable Resources in the University of Wyoming's College of Agriculture, teaches that the most important thing anyone can do for healthy soil structure is to add organic matter.

Manure adds many other nutrients to the soil such as zinc, iron, sulfur, and boron. Manure also makes a good food source for bacteria, fungi, and worms that recycle soil and add to the soil's physical properties. Nutrients in manure vary depending on what the species of animal is and how that animal is being fed. The following chart shows approximate nutrient content of manure from differing species.

## Approximate nutrient content of manure*

| Type | | Nitrogen | Phosphorous | Potassium |
|---|---|---|---|---|
| **Beef** | with bedding | 1.1 % | 0.9 % | 1.3 % |
| | without bedding | 1.1 % | 0.7 % | 1.2 % |
| **Dairy Cattle** | with bedding | 0.5 % | 0.2 % | 0.5 % |
| | without bedding | 0.5 % | 0.2 % | 0.5 % |
| **Horse** | with bedding | 0.7 % | 0.2 % | 0.7 % |
| **Poultry** | with litter | 2.8 % | 2.3 % | 1.7 % |
| | without litter | 1.7 % | 2.4 % | 1.7 % |
| **Rabbit** | | 2.0 % | 1.3 % | 1.2 % |
| **Sheep** | with bedding | 0.7 % | 0.5 % | 1.3 % |
| | without bedding | 0.9 % | 0.6 % | 1.3 % |
| **Swine** | with bedding | 0.4 % | 0.4 % | 1.4 % |
| | without bedding | 0.5 % | 0.5 % | 0.4 % |
| **Turkey** | with litter | 1.0 % | 0.8 % | 0.7 % |
| | without litter | 1.4 % | 1.0 % | 0.9 % |

* At time of land application

Source: *Using Manure in the Home Garden*, which can be found at www.ext.colostate.edu/pubs/garden/07742.html

## Disadvantages

Fresh manure may have excessive nitrogen that will restrict plant growth. Manure may also have high levels of ammonia that may burn vegetation. The salt levels in manure can possibly be high causing damage to plant roots. Do not use manure on salt-sensitive crops without having it first tested for salt content. Manure may contain weed seeds that are still viable. Because of these disadvantages, there is a trend for livestock owners to compost manure. There is also a risk of disease organisms being carried in the manure. Composting will help minimize the risk.

## Composting Manure

Composting reduces the bulk of manure, making it lighter and easier to store and apply. Weed seeds and pathogens may be killed by the composting process if the pile is turned and all contents are allowed to go through the entire process in which temperatures must reach 145 degrees. Properly composted materials have fewer odors, and the nitrogen is more stable. Composting speeds up the break down of materials by creating perfect conditions for the microorganisms to work much faster to create a more usable, soil amendment. When done correctly, composting requires commitment of both time and money. Speak with a local CES educator about how to compost in a management plan.

*Hudson Hill is Lincoln County University of Wyoming Cooperative Extension Service educator specializing in small farm management and can be reached at (307) 885-3132 or hrhill@uwyo.edu.*

# Capabilities of SAREC open door to research opportunities

*By Jim Freeburn*

The University of Wyoming College of Agriculture's new Sustainable Agriculture Research and Extension Center (SAREC) near Lingle is a work in progress with potential for tremendous research opportunities.

SAREC is "not business as usual" for the college and UW's Wyoming Agricultural Experiment Station (AES). The emphasis on systems or holistic research will benefit Wyoming producers and will also provide a unique opportunity for researchers to work on large-scale, long-term projects.

The most unique aspect of the center is the emphasis on integrated research systems. A management committee of farmer-rancher representatives and UW faculty members is developing the control research system for SAREC. The emphasis will foster collaborative relationships among researchers and result in unique and positive


results that will benefit Wyoming agricultural producers.

"This facility is designed to serve the people of southeast Wyoming and to provide them with current, relevant, and cutting-edge information on integrated crop and livestock systems," says Stephen D. Miller, associate dean and director of the Wyoming AES.

The irrigated portion of the farm is comprised of a lateral-move sprinkler, two center pivots, and gravity irrigation. Small plots can be planted under the lateral sprinkler. These projects include plant pathology work in potatoes, sugar beets, and dry beans, and weed research in corn, small grains, sugar beets, and dry beans.

There is also research involving alternative crops, biofuels, and alternative forages. Land under one of the two center pivots will be used as irrigated pasture, of which one-third was drilled to permanent vegetation consisting of a mix of alfalfa and Regar meadow brome and orchard grasses.

One large-scale project on the irrigated farm includes looking at iron deficiency in grain sorghum on land that had been leveled. Many soil samples were taken, along with leaf samples, to analyze the extent of the deficiencies in hopes of solving the problem.

Dry land projects include weed control in sunflowers, winter wheat, and millet, along with variety trials in alternative crops, oil seeds, and medics (any of several Old World herbs in the pea family).

Large-scale work is under way with no-till wheat-fallow rotations and a four-year rotation of wheat, millet, sunflowers, and fallow.

On the rangeland, a modeling project is analyzing available water, timing of moisture, and temperature to help predict how much forage will be produced in a certain growing season.

SAREC's size and assets offer multiple research opportunities in one location. SAREC has 1,522 acres of dry land cropland, 349 acres of irrigated cropland, 1,880 acres of rangeland, 19 acres of irrigated organic cropland, and 40 acres of dry land organic cropland.

Construction at SAREC is setting the stage for many research opportunities. At least five different projects were under construction this year. A new 5,700-plus square-foot building is the cornerstone of the facilities and includes 10 offices, a research preparation room, and a seed laboratory.

The office will also have two meeting rooms – one with a capacity of 65 for community education and another for small groups of up to 15.

Also under construction is a livestock research building, a shop, a hazardous materials facility, and a feedlot.

The livestock facility will have an office and a small laboratory along with a processing area for taking research data from cattle and sheep. The shop will be used to support research efforts at SAREC and will enable UW employees to complete work on farming equipment and more.

The hazardous materials facility will store pesticides and fuels and will meet or exceed all federal standards.

The feedlot will feature 28 pens designed by the U.S. Department of Agriculture's Natural Resources Conservation Service to demonstrate how it can be a model for environmental stewardship and safety.

***Jim Freeburn***

SAREC, which opened in 2004, replaces two UW agricultural experiment stations near Torrington and Cheyenne. It offers six times more dry land acreage and nearly four times more land than the former two centers combined, and this will help broaden the College of Agriculture's research opportunities.

*Jim Freeburn is director of the Sustainable Agriculture Research and Extension Center near Lingle and can be reached at (307) 532-7126 or freeburn@uwyo.edu.*

# Irrigated sunflowers may prove alternative to sugar beets in times of limited water

*By Andrew Kniss*

Drought conditions that have pestered Wyoming are causing uncertainty for producers considering the availability of irrigation water this growing season.

With limited irrigation supplies, there has been increased interest in growing irrigated sunflowers as an alternative rotational crop. Sunflowers may be a viable alternative to sugar beets when grown under limited water conditions. The question arises how can limited irrigation water best be utilized for maximum economic return in sunflowers?

A study by Stephen D. Miller, associate dean and director of the Agricultural Experiment Station in the University of Wyoming's College of Agriculture, and former research scientist Craig Alford determined there is a critical point during sunflower development when insufficient water dramatically affects yield and quality.

While sunflowers can produce an economic crop with limited irrigation, proper timing of watering can substantially boost productivity. Their research and findings are in *Irrigation management in sunflowers*, B-1166.

A single irrigation when a sunflower begins flower initiation (R1 stage) can increase sunflower yield by 125 percent compared to no irrigation. Adding a second irrigation when flowering is complete and the ray flowers are beginning to wilt (R6 stage) further increases yield and can raise oil content by 3.5 percent.

This difference will have a large impact on the economic return, as oil content factors heavily into the payment received. An increase in oil content of 3.5 percent could easily result in a 10- to 12-percent increase in the price paid per pound of seed under many contracts. If late-season irrigation will be available, an attempt should be made to apply water at both the R1 and R6 stage of development to maximize yield and oil content.

Plant population is another factor that may influence sunflower yield and quality under limited irrigation. While yields may be nearly identical for seeding rates of 20,000 or 30,000 plants per acre, oil content was increased by 1 percent as the seeded population increased. This difference was consistent across three years of research and across all irrigation treatments.

Although increasing the seeding rate would cost approximately $5- to $7-per-acre more at planting time, the greater oil content and yield would result in a $7-per-acre increase in net return above the additional seed cost. If supplemental irrigation is to be applied (even if it is limited), planting at a higher population is recommended.

*Irrigation management in sunflowers* can be downloaded free at http://www.uwyo.edu/CES/PUBS/B1166.pdf, or copies may be obtained by e-mailing the College of Agriculture's Resource Center at bixbyd@uwyo.edu, calling the center at (307) 766-2115, or writing to the University of Wyoming, College of Agriculture, Department 3313, 1000 E. University Ave., Laramie, WY 82071.

*Andrew Kniss is a Department of Plant Sciences research scientist in the University of Wyoming's College of Agriculture and can be reached at (307) 766-3949 or akniss@uwyo.edu*

# Irrigated pasture forage establishment and selection

*By Ryan Rapp*

Irrigated pasture can provide forage for livestock through grazing or hay production. It can also conserve and improve soils and provide an alternative for rangeland.

Stocking needs, cost, and availability of land, equipment and materials to establish and maintain the pasture are a few of the many considerations when determining the need and feasibility of an irrigated pasture.

When establishing an irrigated pasture, the varieties chosen are related to use of the pasture. If for year-round grazing, then perennial forages such as cool-season grasses are usually planted. Cool-season grasses usually have more total annual production because they are actively growing more of the growing season than warm-season grasses.

Some popular cool-season varieties are orchard grass, smooth bromegrass, and meadow bromegrass.

Orchard grass is a bunchgrass that begins growing later in the season than the bromegrasses; however, it sustains production later in the year making it a good combination to use with other grasses and legumes.

Smooth bromegrass is very palatable and is a sod-forming grass. This particular species is used in irrigated and dry land conditions making it a good option for Wyoming producers. Meadow bromegrass is another bunchgrass. It will vegetatively reproduce by tillering – sending out shoots from its base. This species offers excellent stand establishment and winter hardiness.

Forage quality and value can be improved in some situations by adding a legume to the grass mixture. A legume improves soil quality by fixing nitrogen. Adding a legume requires close monitoring of the grazing procedures as some species may increase the chance of bloat. Legumes may also have different water needs, fertilizer, and weed-management implications. Some legumes reduce the chance for bloat but are limited in their production while others are higher in production but have a higher chance of causing bloat.

*Ryan Rapp*

Alfalfa is the most-recommended legume for irrigated pastures that can be seeded with grass. Many years of plant breeding show different yield potentials, disease ratings, insect resistance, and winter hardiness.

The important consideration during the selection process is what will the irrigated pasture's primary use be? Is it going to be primarily grazing or an even mixture of grazing and hay production? Choosing an alfalfa variety that offers some grazing tolerance is important if used in a combination of grazing and hay production.

If grazed only, then special attention must be given to grazing tolerance. Remember, an alfalfa variety with grazing tolerance can still cause bloat.

Seeding is very important when incorporating alfalfa into a grass mixture when used in grazing production. If seeded too heavily, it becomes the primary forage, which will increase the chance of bloat. Information is available to help determine the seeding rate to provide the correct percentage of forage and reduce chances of bloat. Beneficial publications are listed at the end of the article.

Irrigated pasture can provide high-quality forage for livestock and can play an important role in many grazing programs. With improved management, the sustainability of pastures and range is improved as well as forage production, carrying capacity, surface and ground water quality, and reduction of soil erosion by both wind and water. Production can be very high and offer forage during most of the year.

**Forage establishment references material on the Web:**

www.ext.nodak.edu/extpubs/plantsci/hay/r563w.htm

www.uwyo.edu/CES/PUBS/Forages/Forage_Pubs_Main.html

www.ianrpubs.unl.edu/epublic/pages/index.jsp?what = subjectAreasD&subjectAreasId = 31

*Ryan Rapp is a forage specialist with the University of Wyoming Cooperative Extension Service and can be reached at (307) 766-4151 or rappr@uwyo.edu*

# Risk management options for dry land hay and forage producers

*By James Sedman and John P. Hewlett*

Much of the farming, forage, and hay production in Wyoming is produced as feed for farmer-owned livestock or for sale to livestock operations.

In addition, there are a wide range of crops cut for hay that are becoming more common in non-irrigated or dry land crop rotations, such as winter peas and millet. Producers of these crops may not realize insurance options exist for the dry land hay and forage. Livestock operations that depend on raised forages as feed inputs can be drastically affected when forage yields decline. Likewise, there are many operations that now depend on hay and forages as cash crops that can be negatively affected. Forage insurance can be beneficial in reducing production risks in many facets of forage production – from seedling insurance, to grain crops cut for hay, and others.

## What is Available?

There are several actual production history (APH)-based insurance options, both yield and revenue-based, as well as group policies available to dry land hay and forage producers. Multi-peril crop insurance (MPCI) and catastrophic coverage (CAT) are the most commonly purchased policies by forage producers. Group Risk Plans (GRP) policies is a crop insurance plan for forage production. Policies vary by county, so producers should check for availability. For insurance purposes, forage is defined as planted perennial alfalfa, perennial red clover, perennial grasses, or a mixture thereof. Silage crops and crops designated as "other hay" should be checked for coverage availability. Spring-planted forages are coverable; however, if seeded after June 30, they are considered fall-seeded for determining the year of establishment. If coverage is not available, producers may want to consider other insurance products such as the non-insured crop disaster assistance program (NAP) administered through the U.S. Department of Agriculture's Farm Service Agency.

## Specifics for Alfalfa Producers

Alfalfa hay is the most common forage crop insured. Typically, alfalfa stands are insured as one of three types based on alfalfa plant counts – alfalfa, alfalfa-grass mixture, and grass-alfalfa mixture. The type of forage determines the dollar value with alfalfa stands being insured at the highest dollar value and grass-alfalfa mixtures the lowest. Alfalfa stands usually cannot be insured as alfalfa for more than three years as dry land stands and five years for irrigated stands. After that, they must be classified as either alfalfa-grass or grass-alfalfa mixes for insurance purposes. The number of years insurable varies for these crops by area so producers should check for availability. Thus, the limiting factors on insurance coverage available for alfalfa hay in APH-based insurance are the stand age and plant count.

## Consult an Experienced Crop Insurance Representative

Producers should determine their insurance needs before purchasing a policy. Determine the goals for the operation, such as how much production from the dry land crops is needed for feed inputs or sale. If the operation must insure a certain level of revenue to meet costs, then some type of crop insurance protection may be necessary. An experienced crop insurance agent should be able to tailor a specific insurance plan to provide the greatest benefit to an operation.

Remember, the goal of any insurance plan should be to maximize effectiveness of the insurance, not minimize premiums paid or maximize insurance indemnity payments.

For more information on this and other risk management topics on the Web, consult the Western Risk Management Library at http://agecon.uwyo.edu/RiskMgt

*James Sedman is a consultant to the UW Department of Agricultural and Applied Economics, and John P. Hewlett is a farm/ranch management specialist in the UW Department of Agricultural and Applied Economics.*