

Washington Animal Agriculture Team Round-Up



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WSU Livestock Listserv

WSU Extension and Department of Animal Sciences have established a new listserv for producers and others interested in educational information from Washington State University about livestock production. To subscribe, send an email with no message to:

SUBSCRIBE-WSULIVESTOCK@lyris.cahnrs.wsu.edu.

If you have problems, contact Tip Hudson at HUDSONT@WSU.EDU.

Animal Health

Black Flies on the Rise?

Livestock owners are familiar with black flies, which cluster in the ears, on the chest, at the midline of the underside of the body, and elsewhere livestock. Humans can be plagued by these tiny bloodsucking flies, too. Flies in this family of Simuliidae are called buffalo gnats (due to their humpbacked appearance) or turkey gnats. They are black, grey or yellowish and black and lay their eggs in moving water. Immature forms develop on water plants, so they are most common near moving bodies of water such as streams, rivers, and irrigation canals. After several generations in the summer, black flies overwinter as larvae attached to plants submerged in unfrozen water. They develop slowly over the winter and emerge as adults in the spring as temperatures warm up. Black flies use visual cues, carbon dioxide concentrations and warmth to find hosts. If populations build up and cattle or other livestock are nearby as a convenient source for a blood meal, black flies can become an

economically important pest. Cattle infested with many black flies bunch together, do not feed, become anemic, and can die. Black flies are likely vectors for the vesicular stomatitis virus, too, according to Dr. Bob Hillman, former Idaho state veterinarian.



Adult black fly. Note humpbacked appearance and short, thick antennae (Oklahoma State University).

Control or management of black flies is not easy. Some livestock owners may choose to encourage populations of native fish and other aquatic predators. For horses, fly sheets and fly masks with ears can help keep the flies off the animals. Petroleum jelly or baby oil smeared in the ears and on other places on the body can serve as a barrier to the bloodsuckers. There are other petroleum oil-based products with insecticide added that will work to keep the flies off your horses. Since black flies are day-fliers, stabling horses during the day and pasturing during the night is a simple change in management to keep the black fly problem at bay. For any livestock, providing run-in sheds for animals during the day can provide a refuge from the flies, which avoid dark, shaded areas. A research study in northern Alberta, Canada demonstrated that providing a simple open-fronted shed was sufficient to protect cattle from black flies. Dr. Doug Colwell from the Lethbridge Research Centre in Lethbridge, Alberta noted that black flies visualize a grazing animal as a silhouette, and if the animal is in a shelter against a dark, shady background, it's more difficult for black flies to locate their host.

Recently, areas of Idaho have had huge populations of black flies that pestered livestock and people. One report indicated they would get so thick in the sky that aerial applicators could not see to fly. In 2004, economic losses in the beef, sheep, dairy, and horse industries of several southwestern Idaho counties were estimated at well over \$1 million (USDA FSA, Idaho). County budgets and private donations provided funds to control black flies using larvicide in irrigation canals and other bodies of water.

The beef cattle pest management team, headed by Holly Ferguson and Doug Walsh and based at the WSU-Prosser station, has conducted statewide surveys of flies and other insects in cattle pastures and rangeland over the past two seasons. Data indicate that black flies start appearing in May and are present throughout the summer. They have only been found at ranch locations with running water such as irrigation canals or streams running through pastures. It has been suggested that

an increase in weeds in streams and canals may encourage buildup of black fly populations, because black flies lay eggs on plants in the water. This year, we will be monitoring all livestock fly pests (e.g., face fly, horn fly, black fly, stable fly, housefly, mosquito) in about 12 locations across the state, including five ranches west of the Cascades. If you think you have a black fly problem or need assistance identifying the flies bothering your livestock, please contact Holly Ferguson at hferguson@wsu.edu or 509-786-9233.

For more information

www.agweekly.com/articles/2007/02/08/commodities/dairy/dairy91.txt
www.ag.uidaho.edu/pmc/Black%20Flies.pdf

--Holly Ferguson, PhD
WSU-Prosser

The High Costs of Pinkeye

Pinkeye is the common name for Infectious Bovine Keratoconjunctivitis (IBK). This infectious disease of cattle is commonly seen in July and August in the Pacific Northwest. Affected cattle have red, swollen, sore eye(s) and change their behavior to alleviate the discomfort. Those changes can cost the cattle producer a bunch of money. A 1997 report published by the National Animal Health Monitoring system (NAHMS) found pinkeye to be the second most common adverse health condition in breeding age beef females. If untreated, pinkeye can cause blindness. Cattle reduce feed intake and search out shady areas due to sun sensitivity of the infected eye. Calves have a high susceptibility to the disease and a pinkeye infection prior to weaning will have a significant impact on profitability. In one study, pinkeye infections reduced calf weaning weights by 35 to 40 pounds. Discounts for "blue eyes" from pinkeye-scarred corneas are often seen at sale yards.

Pinkeye in a cow. From www.ext.vt.edu/pubs/beef/400-750/400-750.html.



Pinkeye is highly contagious and easily spread by face flies. Steps producers can take to reduce the risk of pinkeye include:

- Controlling face flies with insecticide-treated ear tags, fly predators, dusters and/or endectocides (larvicide incorporated in trace mineral supplements).
- Mowing pastures if needed to reduce eye-irritating seed heads and high forage height.
- Vaccinating annually for pinkeye 4 to 6 weeks prior to fly season.
- Providing some shade.

As with most diseases, prevention of pinkeye, rather than treatment, is the optimal situation. If infection occurs, prompt treatment can reduce affected animals' discomfort, curtail losses and decrease spreading to the rest of the herd. Dr. Mike Tripp of Oklahoma reports, "We have been really successful with an oxytetracycline injection for cattle with pinkeye problems. It works well because we can give one dose with a seven to eight day systemic effect." Several eye sprays were used with injectable antibiotics in the past, but the spray ingredients are now illegal for use in food animals.

For several years, cases of "winter pinkeye" have occurred in the region. Affected eyes are irritated, watering, sensitive to light and have all the symptoms of pinkeye, but do not respond to antibiotics. The mysterious eye problem has been linked with burdock plants. Burdock grows in riparian areas and has very small burrs in the fragmented seedheads.

--W. Frank Hendrix
WSU Yakima County Extension Faculty

For More Information

www.ext.vt.edu/pubs/beef/400-750/400-750.html
www.oznet.ksu.edu/library/LVSTK2/MF2210.PDF
www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/30500.htm&hide=1
<http://animalscience.ag.utk.edu/beef/pdf/PinkeyeInBeefCattleAS-B307-FMH-WWG.pdf>
www.countrysidemag.com/issues/92/92-1/Heather_Smith_Thomas.html

West Nile Virus Vaccine Update

The American Association of Equine Practitioners (AAEP)—a non-profit organization focusing on horse health and welfare—recently updated its equine vaccination guidelines. The AAEP identified Tetanus, West Nile Virus (WNV), Eastern and Western Equine Encephalitis (EEE/WEE) and Rabies as "core" equine vaccinations, meaning these vaccines are effective, safe and warranted in most areas of the country. There are many additional vaccines licensed and available for horses; their use depends on various risk-versus-benefit factors, so a veterinarian should be consulted for advice. This article focuses on WNV vaccines; the article in the next newsletter will focus on the remaining vaccines.

Brief Overview of West Nile Encephalitis

West Nile Encephalitis (WNE) has been on the map as a U.S. equine health concern since 1999 when it came on the scene in N.Y. As depicted in Table 1, 25 equine cases were reported in 1999, progressing to a high of 15,257 recognized cases in 2002. Reported cases have declined each year since 2002, probably due to naturally-acquired immunity and vaccination.

The virus is maintained in avian reservoirs and transmitted by mosquitoes to other avian and mammalian hosts. Horses are the main non-human mammal affected by WNV. They are "dead-end hosts," meaning they do not spread the disease.

WNV affects nervous system tissue and causes encephalitis (inflammation of the brain). Affected horses can show weakness, incoordination, difficulty rising, elevated temperature, depression, muscle twitching, behavior changes, circling, head pressing, seizures, blindness, paralysis, coma and/or death. Most infected horses do not show signs of illness or perhaps just a transient fever, mild depression and appetite loss. However, of those showing signs of significant illness, about one-third die. About 40% of horses that survive clinical disease have behavioral, motor or other nervous system changes for months or even permanently.

Table 1. Summary of Numbers and Distribution of Recognized Cases of WNV in the U.S. (USDA Animal Plant Health Inspection Service data)

Year	Number of Equine Cases	Number of States with Equine Cases
1999	25	1
2000	60	6
2001	738	20
2002	15,257	41
2003	5,181	42
2004	1,406	38
2005	1,088	35
2006	1,086	33
2007	468	34

WNV Vaccines (Note: The information herein is supplied for educational, reference and clarification purposes only and with the understanding that no discrimination is intended. Listing of commercial products implies no endorsement by WSU Extension. Criticism of products or equipment not listed is neither implied nor intended. The WNV vaccine is now available in combination with many other equine vaccines; discuss the use of these combinations with your veterinarian).

1. West Nile INNOVATOR®. This is a killed, whole-virus vaccine produced by Fort Dodge. Horses should receive an initial one-ml intramuscular vaccination in the spring well before mosquito season starts, followed by a booster in three to six weeks and an annual spring booster thereafter. Ninety-five percent of horses vaccinated according to manufacture’s recommendations are protected against developing WNV viremia (virus in the bloodstream).

2. RECOMBITEK®. This vaccine is manufactured by Merial. It uses a modified canarypox virus to deliver specific WNV proteins to a horse’s immune system, which then responds by creating protection against these WNV proteins and WNV infection. The canarypox virus does NOT replicate in the horse. This vaccine has been demonstrated as safe and effective; 90% of horses are protected against viremia after vaccination. Reconstitute the vaccine with the sterile diluent provided and inject one ml intramuscularly. Booster with a second one-ml dose four to six weeks later, then once annually in the spring.

3. PreveNile™. Intervet manufactures this WNV vaccine. It uses a WNV-Yellow Fever virus “hybrid” to deliver WNV proteins to the horse, which stimulates an effective immune response against WNV. This vaccine is 90% effective against both viremia and clinic disease (encephalitis). Reconstitute the vaccine with sterile diluent and give a single, one-ml intramuscular injection followed by annual boosters.

4. West Nile INNOVATOR® DNA. Also produced by Fort Dodge, this WNV vaccine contains WNV DNA. It is protective against WNV viremia. An initial two-ml dose should be administered intramuscularly, followed by a second two-ml dose two to four weeks later. Duration of immunity is not known for this product, so boosters are recommended in the face of a local outbreak or other conditions favorable to WNV.

5. West Nile Virus Antibody. This product is manufactured by the Colorado Serum Company and has a conditional license. Testing is still being conducted regarding effectiveness. It is for horses at least one year old as a WNV disease control aid. It must be given intravenously by a veterinarian.

“Vaccination for West Nile virus is recommended as a core vaccine and is an essential standard of care for all horses in North America.” --AAEP Guidelines for the Vaccination of Horses, 2008.

Vaccination Schedules

Work with your veterinarian to establish a specific vaccination program for your horse(s). Your veterinarian may advise annual boosters in both spring and late summer, especially for high-risk animals (those less than five years old, more than 15 years old, immunocompromised, etc.). In previously-vaccinated horses, vaccines can be interchanged without starting the initial vaccination process again.

Previously-vaccinated adult horses should have an annual booster in the spring before mosquito season begins. For *unvaccinated adult horses*, follow the manufactures recommendations mentioned above for each specific WNV vaccine.

Although none of the licensed WNV vaccines are labeled for use in pregnant mares, thousands of pregnant horses have received WNV vaccinations because the risk of disease was perceived to be much greater than the risk of vaccination. *Previously-vaccinated mares* should receive booster doses about four weeks before foaling. *Unvaccinated pregnant mares* should receive the initial vaccination series recommended by the vaccine manufacturer as soon as possible and a booster four weeks before foaling. Antibody response in previously-unvaccinated mares may be limited.

A great deal more research is needed regarding the timing of WNV vaccination in *foals from vaccinated mares*, particularly regarding maternal antibody interference with active immunity in the foal. Here are the AAEP's recommendations for each product. With all vaccines, individuals may be vaccinated more often if warranted by risk factors.

- **Innovator®**: Give a three-dose series starting when the foal is four to six months old, with four to six weeks between vaccinations. Give the last dose when the foal is 10 to 12 months old and prior to the onset of mosquito season.
- **Recombitek®**: Give a three-dose series of vaccinations beginning when the foal is five to six months old with four weeks between vaccinations. Give the third vaccination when the foal is 10 to 12 months old and before the start of mosquito season.
- **PreveNile™**: Give a single dose to foals five months old or older. A second dose should be given when the foal is 10 to 12 months old and before the start of mosquito season.

In *foals from unvaccinated mares*, vaccinations should be started when the foal is three months old and preferably completed before mosquito season begins. These foals may be vaccinated more frequently than recommended depending on individual risk assessment and veterinary advice.

- **Innovator®**: Give three doses with 30 days between the first and second dose and 60 days between the second and third doses; decrease this interval to 30 days if mosquito season has begun.

- **Recombitek®**: Begin vaccinating foals when they are five to six months old; give a second dose 30 days after the first dose.
- **PreveNile™**: Although there is no research to support it yet, this product is preferred for use in foals under five months old born to unvaccinated mares, especially if mosquito season has begun and/or the disease risk is high.

Horses that have recovered from natural infection probably have lifelong protection. Booster vaccinations are recommended only if the individual becomes immuno-compromised or upon veterinary recommendation.

Final Recommendations

It is essential to work with your veterinarian to customize a vaccination program for your horse(s). If you administer the vaccine yourself, be sure to use aseptic technique, follow the manufacturer's recommendations, administer the appropriate dose and be prepared to detect and respond to allergic reactions.

Do not rely exclusively on vaccination to prevent West Nile Fever. Mosquito control measures, approved insect repellents and sheltering horses from mosquitoes will also help reduce risk. Refer to the references below for detailed control measures.

For More Information

www.aphis.usda.gov/vs/nahss/equine/wnv
www.aaep.org/vaccination_guidelines.htm
www.cdc.gov/ncidod/dvbid/westnile/qa/wnv_horses.htm
www.cdc.gov/ncidod/dvbid/westnile/index.htm
<http://agr.wa.gov/FoodAnimal/AnimalHealth/Diseases/WestNileVirus/default.htm>
www.extension.org/pages/West+Nile+Virus+in+horses

--Dr. Susan Kerr
WSU-Klickitat County Extension Director



Image reprinted with permission from Public Health-Seattle & King County.

Forage and Forage Management

Soil Testing

WHAT IS A SOIL TEST?

A soil test is a process by which plant nutrient elements (phosphorus, potassium, calcium, magnesium, sodium, sulphur, copper, zinc, etc.) are chemically measured for their "plant available" content in a soil sample. A soil test also measures soil pH. The results indicate the quantity of available nutrients and can be used to determine the recommended levels of fertilizers needed.

WHY DO YOU NEED A SOIL TEST?

When growers guess about the need for lime or fertilizers, too little or too much could easily be applied. This is called the "shotgun method". By using a soil test report, the grower does not need to guess.

By using a soil test report to determine fertilizer and lime needs, a grower:

1. Identifies whether there is too little or too much of a plant nutrient in the soil.
2. Encourages plant growth by providing the best lime and fertilizer recommendations.
3. Promotes environmental quality by applying only as much fertilizer as is necessary which minimizes nutrient runoff into water.
4. Saves money that might otherwise be spent on unneeded lime and fertilizer.

TAKING A GOOD SOIL SAMPLE

To be accurate and of value, a soil sample must be taken at the right time and in the correct way.

Time it right. Take a soil sample far enough ahead of any new seeding so there is time to receive the results, locate and purchase fertilizer and apply prior to seeding. This is especially important with surface applications of lime, phosphorus and potassium, because they are not very mobile in the soil.

Use clean sampling equipment. Use a soil probe, spade, hand trowel or shovel to collect

the samples. Do not use brass, bronze or galvanized tools, because they will contaminate the samples with copper and/or zinc. Mix samples in a clean plastic bucket that has been washed thoroughly.

Sample to the appropriate depth. For pastures, 8 -12" is recommended. Crop fields should be sampled at least 12".

Sample each unique area separately. Each sample should represent only one soil type or field. For each unique area, take at least 6 to 8 random sub-samples, mix them well in a clean bucket and place a representative sample of the mix from in a small plastic bag. Label the sample completely and accurately. Submit the samples to the lab for testing.

For More Information

<http://wsprs.wsu.edu/AnalyticalLabsEB1578E.pdf>
<http://extension.oregonstate.edu/catalog/pdf/ec/ec1478.pdf>
<http://soils.usda.gov>
<http://extension.oregonstate.edu/catalog/pdf/ec/ec628.pdf>

--John Fouts
WSU Walla Walla County Extension Educator

Why Cut Hay Early?

The most obvious reason to cut a hay crop early is for greater nutritional quality. Other factors to consider when deciding how early to cut include pest and weed populations, frost damage, water availability, equipment and labor issues.

Protein content of alfalfa can easily decrease by three or more percent from the pre-bloom to mid-bloom stage, while Acid Detergent Fiber can increase as much as five percent or more. Neutral Detergent Fiber can increase by as much as seven or more percent. The same nutritional quality decline occurs in grasses due to the increase in indigestible fiber in mature plants.

The other side of the story is that total tonnage increases with time. So, one of the major factors in determining how early to cut is what will be the end use of the hay? What is your market? What is the price difference between top nutritional quality hay and lower nutritional quality hay? If you are feeding it yourself, what quality do your animals need and what other forage sources do you have?

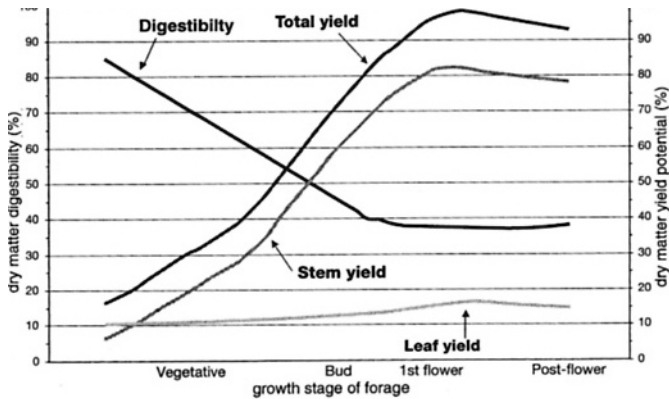
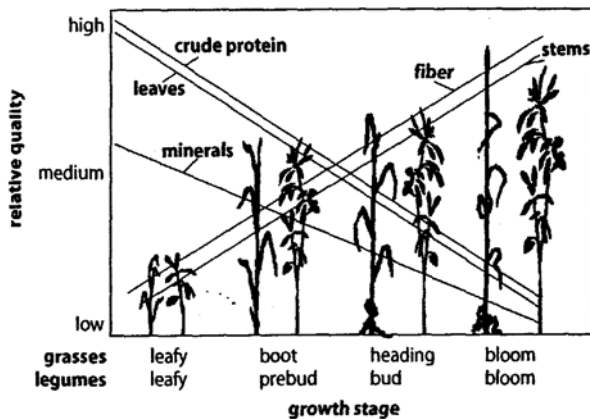


Figure 9.2. Total forage yield increases with plant maturity to the full flower stage, then declines. Leaf yield is relatively constant throughout the growth stages so most of the total yield increase is from the stem. Forage digestibility decreases with plant maturity.

Figure 3. Effect of plant maturity on forage intake and digestibility.



Source: Adapted from Blaser, R., R.C. Hammes, Jr., J.P. Fontenot, H.T. Bryant, C.E. Polak, D.D. Wolf, F.S. McClagherty, R.G. Klein, and J.S. Moore. 1986. Forage-animal management systems. Virginia Polytechnic Institute, Bulletin 86-7.

Another important factor to consider in an early cutting decision is the weather risk. The alfalfa plant develops in relation to environmental temperature. The plant develops faster with higher temperatures and it develops slower with lower temperatures. With unsettled spring weather, sometimes alfalfa development can be very erratic. This

is one of the times when the “art” of haymaking comes into play.

Earlier maturity hay with a little rain damage is usually better nutritional quality than later maturity hay with no rain damage, depending on the amount of damage. If you are selling hay, sometimes rain damage can be more detrimental to price than the quality decrease.

Alfalfa weevils can decimate a crop’s quality and yield. The alfalfa weevil is a foliage (leaf) feeder. The larval stage does most of the damage. The alfalfa weevil is normally a first-cutting pest, but in some areas may cause serious damage to the re-growth with resulting losses to the second crop.

The economic threshold for alfalfa weevil control changes with the height of the alfalfa. Once alfalfa weevil populations reach the economic threshold level, the application of an insecticide or harvesting are the only satisfactory methods of control. Early cutting may keep the population from reaching the economic threshold. Carefully monitored flash grazing can help control weevil larval populations, but the issue of bloat prevention must be addressed for ruminants.

If alfalfa is frosted during first cutting growth, the growth rate decreases and the maturity rate increases. Because of this, sometimes the best management is to early cut after the frost damage and get started with the re-growth for a second cutting.

Early cutting can be an effective method of controlling downy brome or bulbous bluegrass. By cutting early, these grassy weeds will not affect the overall quality as much as waiting for the alfalfa to grow more. This also will result in a cleaner second cutting of alfalfa, because the grasses won’t re-grow as well as the alfalfa.

First cutting is a very stressful time for the hay producer. There are many pitfalls and hurdles to overcome, but with some knowledge of the problems and options—and a little luck—producers have a better chance of getting hay in the shed green and dry.

--John Fouts
WSU Walla Walla County Extension Educator

Analyzing Forage Lease Rates

Leasing forage sources is increasingly important for livestock producers, particularly cattle ranchers. Forage stands include dryland or irrigated pasture, range or crop aftermath. Technological improvements in temporary electrical fencing have improved its durability and affordability and allowed the conversion of previously-unavailable forage stands into grazing plots. One example of newly available forage stands is this year's critical feed use of Conservation Reserve Program (CRP) acres.

Often, holders of forage stands are not livestock producers. One way to take advantage of forage resource is to lease the forage. However, determining forage lease terms is complex due to many factors, including available acres, quality of the forage stand, location, water sources, length of grazing time, number and size of grazing animals, available permanent fencing, and services the land owner provides such as water supply, health checks, fence maintenance, and providing minerals and salt. These factors are related to determining stocking densities. One may want to graze a small number of animals with a long grazing period (a low stocking density) or a large number of animals with a short grazing period (a high stocking density).

The purpose of this article is to review forage lease arrangements to help tenants and land owners analyze lease conditions and develop fair forage lease arrangements. For any given forage source, there is an optimal stocking density to match the seasonal forage growth cycle that results in highest possible rates of gain. Unfortunately, it is difficult to hit the optimal stocking density because of fixity in livestock numbers and constraints on when forage is available or needed. In most cases, optimal grazing time is the spring forage growth flush, but the livestock producer may need to stockpile forage stands for winter grazing. However, the critical feed use of CRP forage is only allowed from August 1 to November 10, when the CRP forage stand's nutritional quality is lower relative to its spring growth, but it is an important new forage source given high hay costs.

Defining Stocking Rates

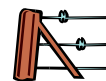
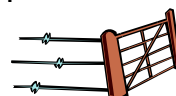
Specifying stocking rates in forage lease agreements is needed to prevent overgrazing forage stands and disagreements between landowners and tenants. Stocking rates are commonly defined in terms of animal units (AU) that are based on the amount of forage consumed by the animal over one month (AUM). Table 2 presents animal unit equivalents defined by the USDA Natural Resources Conservation Service.

Type of Livestock	Animal Unit Equivalents
Beef Cow, dry	0.92
Cow-Calf pair (calf less than 300 lbs)	1.00
Mature Bull	1.65
Cattle, 1 year old	0.60
Cattle, 2 year old	0.80
Mature Horse	1.25
Mature Sheep	0.20
Lamb, 1 year old	0.15
Mature Goat	0.15

www.la.nrcs.usda.gov/programs/csp/2008_Grazing_Land_Record_Forms.doc

Setting lease terms on a per-acre basis gives an incentive to the livestock owner to stock heavily. On the other hand, the landowner's incentive is for a light stocking rate to preserve pasture and wildlife groundcover for subsequent leases. Forage leases under a shared gain basis could lead to overgrazing to achieve maximum gain. It is in the interest of both parties to establish stocking rates that achieve maximum economic return while maintaining grass stand quality. Points to consider in establishing the stocking rate are:

- The condition of the forage as impacted by weather and length of grazing time, which determines the carrying capacity of the forage resource
- Forage needs of the tenant to achieve desired rates of gain
- Effective use of rotational grazing
- Management and financial goals of the landowner.



(continued...)

Establishing Lease Rates

There are three approaches to establishing lease rates: the landowner's cost basis, the livestock owner's return to gain basis, and the shared gain basis.

The landowner's cost basis uses the land's value and annual costs. Land is valued at current fair market value, which is multiplied by the landowner's desired rate of return on the land. Pasture rental rate analysis publications use 5 to 7% return rate for pasture leases. The current fair market value includes capital improvements such as fences and livestock-working facilities so return on those investments can be included in the cost calculation. Current fair market value also incorporates current economic conditions into lease rate calculations. The landowner will also want to recover out-of-pocket expenses for taxes, repairs, fertilizer, etc. Here is an example calculation:

Land/improvement value per acre	\$700/acre
Desired rate of return (percent)	<u>x 0.06</u>
	\$42/acre
Per acre annual cost (taxes, repairs...)	+ \$12/acre
Total annual ownership cost	\$54/acre
Annual AUM stocking capacity	÷ 3 AUM/acre/yr
Monthly per acre rental rate	= \$18/acre/mo.

The monthly lease rate with these assumptions is \$18 per month for a stocking capacity of one AU per acre per month. The pasture can support one AU for three months or 3 AUMs annually, so in this example if the total pasture size is 140 acres, it could support 140 cows for three months. It is the tenant's responsibility to use the 3 AUM efficiently when the forage is available.



USGS workers install a fence on CRP land. From <http://biology.usgs.gov/cro/ScienceInYourState/Montana/MT-brd.htm>

To evaluate if a lease rate is acceptable from a tenant's perspective in the second approach, a livestock owner's net return can be calculated. Continuing with the assumption of a 3 AUM annual stocking capacity or one acre per AUM, an example calculation of livestock owner net return using a stocker example is:

Animal purchase cost (600 lbs x \$1/lb)	\$600/hd
Production costs (health, losses, etc.)	\$60/hd
Labor/management cost	<u>\$15/hd</u>
Total costs per head	\$675/hd
Sale revenue (735 lbs x \$.95/lb)	\$698.25/hd
Net Return per head	\$23.25/hd
Stocking rate/acre (1 AUM/0.6 AUE) x 1.7 AU	
Total Return/acre/3 months of gain	= \$39.52 /acre
Months in lease	÷ 3 months
Livestock owner return	= \$13.18/acre/mo.

Stocker have a 0.6 animal unit equivalent (Table 1), so each acre of this forage source can support 1.7 stockers/month. In this example, roughly 1.5 pounds of gain/day over the three-month grazing period produced 135 lbs of gain. With the costs and returns used in this example, the livestock producer has a positive net return of \$23.25/head, which pays the livestock producer's labor and management fee of \$15/head. Given the stocking capacity of the pasture of one AUM per acre, the stocker can run 1.7 stockers per acre for the three-month grazing period, which provides the stocker operator a total return per acre of \$39.52 or \$13.18/month.

In the above example, the landowner seeks \$18/acre/month and the stocker operator can pay up to \$13.18 and maintain his labor and management fee. The two parties may begin negotiations at this point. If the stocking capacity could be increased above one AUM per month while maintaining the same rate of gain, the stocker operator would generate additional revenue and would be willing to pay a higher per month rental fee. Alternatively, they could negotiate a share of the gain lease agreement (the third approach). In this case, the landowner assumes some of the production risk but could benefit in years when forage growth is better than average or when the market provides positive price movement.

Conclusions

Because there is not a commercial market for pasture, determining forage lease rates often becomes a matter of bargaining. Supply and demand is probably the most important factor in determining price. If there is a large quantity of pasture available in a given area and few livestock producers needing extra pasture, rents may be low. In times of high hay prices, forage value increases due to the increased cost of alternative feedstuffs. Landowners need to consider the positive aspects of grazing their forage stands to reduce thatch buildup, improve nutrient recycling, decrease fire fuel loads, and improve water infiltration, all of which will enhance forage yields over time.

For More Information

Hofstrand, D. and W. Edwards, "Computing a Pasture Rental Rate", July 2003, www.extension.iastate.edu/agdm/wholefarm/html/c2-23.html

Langemeier, L., "Pasture Rental Arrangements for your Farm", North Central Regional Extension Publication No. 149, Kansas State University, 1997.

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Washington Animal Agriculture Team members' contact information and publications can be found at <http://animalag.wsu.edu>.