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Dear Valued Forage Producer,

The University of Minnesota Forage Team is proud to announce the second edition of the Forage Quarterly. The January issues ranges in content from alternative forage systems to acquisition of pasturelands. In addition to the valuable information in this edition, the UMN Forage Team would like to inform you of our upcoming *Forages for "U"* winter meetings. The *Forage for "U"* program was designed to address key forage production and management issues in Minnesota. The forage workshops are positioned throughout MN in areas that represent signification forage and grazing production. The locations for the 2015 *Forage for "U"* workshops are:

Hutchinson (February 10th) agenda beginning with registration at 10:00 am*: Corn Silage Forage Analysis and Variety Selection* (Jim Paulson, University of Minnesota Extension), *Alfalfa/Grass Hay Production, Planting to Harvest* (Doug Holen, University of Minnesota Extension), *Alfalfa Vareity Trial Update and Alfalfa Establishment Strategies: a Pathway to Increased Yield* (Dr. Scott Wells, University of Minnesota Extension), and *Soil Fertility and its Impact on Forage Quality* (Dr. Dan Kaiser, University of Minnesota Extension).

Fergus Falls (February 10th) agenda beginning with registration at 4:30 pm: *Forages and Alternative Feeds in Beef* (Jim Paulson, University of Minnesota Extension), *Beef Cow Pregnancy Health–Diets and a MN Board of Animal Health Update* (Dr. Randy Lindemann, DVM), *Adding Value to Your Herd – From a Feedlot's Perspective*, (Tom Bresnahan, Sinner Bros. & Bresnahan Feedlot), *Productive Pastures, Managing for Tonnage* (Dr. Krishona Martinson, University of Minnesota Extension) and *Alfalfa/Grass Hay Production, Planting to Harvest* (Doug Holen, University of Minnesota Extension).

Rushford (February 20th) agenda beginning with registration at 9:30 am: *2015 Pasture/Grazing Management* (John Zinn, NRCS Grazing Specialist), *Grazing/Pasture Producer Panel (local producers), 2015 Alfalfa Management*, (Dr. Scott Wells, University of Minnesota Extension), and *Alfalfa Management Producer Panel* (local producers).

Participation fee is $30 including meal and handouts. Registration is preferred and can be done through our website (http://z.umn.edu/foragesforu) or contacting Doug Holen 218-770-4396 for the Fergus Falls location, Nathan Winter at 320-484-4303 for the Hutchinson location, and Jake Overgaard at 507-457-6440 for the Rushford location. Program brochures can be mailed or emailed upon request.

Sincerely,

University of Minnesota Forage Team

Double–Cropping with Pea–Barley Forage Mixture

Double-cropping is one strategy for maximizing productivity of a field. In double cropping systems, two crops are harvested from the same field in a single season. In a typical rotation, a fall-seeded cool-season crop is harvested for biomass in late spring and directly followed by a warm-season crop. By expanding the growing season to include late fall and early spring, biomass yield increases over single-cropping systems may be as large as 25% (Hegenstellar et al. 2009). Double-cropping can also improve nutrient uptake in N- or P-saturated soils, reducing nitrate runoff as well as saving on fertilizer costs (Krueger et al. 2010).

However, harvest dates of cool-season crops can have significant impacts on grain yields. Double-cropping may delay planting date by 2-6 weeks, resulting in a shortened growing season for warm-season crops and reducing grain yield. In this context, forages are well adapted to double-cropping rotations; two harvests of forage biomass can provide higher financial returns per acre than single grain

Double–Cropping with Pea–Barley Forage Mixture (Continued from page 1)

Picture 1. Early season growth of forage pea/barley mixture planted into corn stubble May 5th.

crop.

Challenges: Due to its extreme winter temperatures and short growing season, Minnesota's climate provides unique challenges for growers looking to incorporate high-value forages into their management practices. Several strategies may increase the profitability of double-cropping in Minnesota. The incorporation of legumes in a forage crop can greatly increase its feed value over sole-cropped crops such as winter rye (Strydhorst et al., 2008). Additionally, the roots and stubble of a legume-cereal mix may provide a significant source of nitrogen to subsequent warm-season crops, reducing the need for N-fertilizer costs and increasing returns per acre. However, few legumes are winter-hardy in Minnesota. Legume-cereal mixes must be planted in the spring, which may result in an even longer delay in warm-season crop planting than in typical double-cropping systems. This delay could be me managed using early maturating grain cultivars .

Research: Current research at the University of Minnesota is investigating whether the combination of high-value spring planted forages, reduced N-fertilizer applications, and early-maturing corn varieties can increase the profitability of double-cropping in Minnesota and compete favorably with traditional full-season corn rotations.

A pea-barley forage mix, chosen for its high yield and excellent feed value *, was planted in March of 2014. At maturity, it was harvested for forage, and followed by one of three early-maturing summer crops; A dual purpose silage/grain corn (Pioneer 8906 AM1), a recently developed semidwarf corn (Schaefer et al. 2011) and soybean.

The corn varieties were exposed to six N rates, ranging from 40 lbs N ac^{-1} to 200 lbs N ac^{-1}. Corn was harvested for grain (semidwarf corn and full-season corn) and silage (Pioneer 8906 AM1) in October. Winter rye was planted after harvest, and will be harvested for forage again in the spring of 2015. The study will be replicated at two locations in 2015.

Forage Pea Project Objectives:

1) Compare grain yields and total biomass production of a spring forage—short-season grain—winter rye rotation to a full-season corn—winter rye rotation in Minnesota.
2) Determine nitrogen use efficiency of double-cropping rotation to full-season corn.
3) Assess economic viability of a double-cropping rotation for farmers based on forage quality, grain/silage yield and input costs.

Preliminary Findings: Weather posed substantial challenges during this past growing season. The cool, wet

Table 1. Summary of treatments, planting dates, harvest dates and yield.

Treatments	Relative Maturity	Pea/ Barley Planting Date	Pea/ Barley Harvest Date	Pea/ Barley Yield DM (ton ac^{-1})	Crop Planting Date	Crop Harvest Date	Product	Yield
Full Season Corn	102	-	-	-	May 6	Oct 8	Grain	178 bu ac^{-1}
Dual Purpose Corn	89	May 5	June 30	3.5	July 2	Oct 8	Silage	15 ton ac^{-1}
Dwarf Corn	62	May 5	June 30	3.5	July 2	Oct 8	Grain	25 bu ac^{-1}
Soybean	0.6	May 5	June 30	3.5	July 2	Oct 8	Grain	-

Double–Cropping with Pea–Barley Forage Mixture (Continued from page 2)

spring delayed spring forage harvest until June 30; summer crops were not planted until July 1. Although the full-season corn and 62-day semi-dwarf

Picture 2. Late season growth of forage pea/barley mixture planted into corn stubble May 5th.

variety reached maturity by early October, the dual-purpose variety did not mature, and was harvested for silage.

Discussion: Full-season corn performed well, as it did not experience delayed planting. It yielded 178 bu ac^{-1}, well within 2014 county averages. Planting date had strong effects on corn silage yields. In 2014 corn silage variety trials conducted by the University of Minnesota, similar corn silage varieties yielded over 30 ton ac^{-1}; a 50% yield reduction can be explained by a delayed planting; planting in late June can typically results in a decline in yield of at least 40%. Semi-dwarf did not yield as expected. In previous university trials, it yielded over 150 bu ac^{-1} (Schaefer et al. 2011). Planting date and poor stand establishment help explain the poor yield of this variety. Cool, wet spring weather can also explain relatively low forage yields.

References

Heggenstaller, et al., 2009. Growth analysis of biomass production in sole-crop and double-crop corn systems. Crop Science, 49:2215-2224

Krueger, et al., 2010. Growth stage at harvest of a winter rye cover crop influences soil moisture and nitrogen. Online. Crop management doi:10.1094/CM-2010-1014-01-RS.

Schaefer, et al., 2011. Breeding potential in semidwarf corn for grain and forage in the northern U.S. corn belt. Crop Science. 51:1637-1645.

Strydhorst, et al., 2008. Forage potential of intercropping barley with faba bean, lupin, or field pea. Agron. J., 100:182-190

As the study progresses, future results will be presented at University of Minnesota Extension Forage Website http://www.extension.umn.edu/agriculture/forages/

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Alternative Annual Forages

Alfalfa is the most critical and widely produced perennial forage crop in the upper Midwest, contributing immensely to the livestock and dairy production of the region. In recent years though, highly variable and severe winter conditions have increased the risk of winter injury. During the 2012-2013 winter, nearly

Table 1. Warm season forage grass species and seeding rates no-till planted into winterkilled alfalfa in experiments 1 and 2

Forage	Species	Seeding rate (lb ac^{-1})	EXP*
BMR Sorghum	*Sorghum bicolor*	35	1,2
Sundangrass	*Sorghum bicolor* subsp. *drummondii*	45	2
Sorghum x Sundangrass		35	2
Annual ryegrass	*Lolium multiflorum* (cv. 'Jumbo')	30	1,2
Japanese millet	*Echinochola esculenta*	35	1,2
Italian ryegrass	*Lolium multiflorum*	30	2
Teff	*Eragrotis tef*	12	
Annual ryegrass + Red Clover	*Trifolium pretense*	8/15	
Siberian foxtail millet	*Echinochloa frumentacea*	-	
Perennial ryegrass	*Lolium perenne*	-	

* Abbreviations: EXP, Experiment.

Alternative Annual Forages (Continued from page 3)

1,000,000 acres of alfalfa in Minnesota and Wisconsin experienced winter injury and winterkill. Such environmental threats demand development and improvement of response management strategies to better alleviate loss and maintain production in forage systems. Replanting alfalfa shows very low success due to residual autotoxicity and prevented planting conditions that often coincide with winterkill and persist into the summer months. Warm season annual forages can serve as valuable alternatives to fill this void and account for lost production.

Table 2. Yield totals (t ac^{-1}) by species and nitrogen rate

Species	lbs N ac^{-1}		
	0	50	100
Teff	4.22	4.22	4.90
Sudangrass	3.63	3.67	4.59
Annual Ryegrass	3.59	4.09	4.39
Red clover/ryegrass	3.68	4.42	4.27
Italian ryegrass	3.25	3.31	4.17
Japanese millet	3.02	2.60	3.97
Sorghum sudangrass	3.25	3.66	3.85
BMR sorghum	3.48	3.67	3.83

Initial trials conducted in Rosemount in 2013 (Experiment 1) evaluated six warm season grasses (Table 1) and provided refinement of species selection for the current study. Field trials are currently underway (2014 -2015) in Rosemount and Waseca, MN (Experiment 2), analyzing a range of forage species (Table 1) no-till planted into winterkilled alfalfa residue in late May or early June. Forage yield and quality are assessed in response to intensive cutting management and variable N fertilizer rates. Harvest events occur on 30 day intervals after planting for three cuts, concluding in early September.

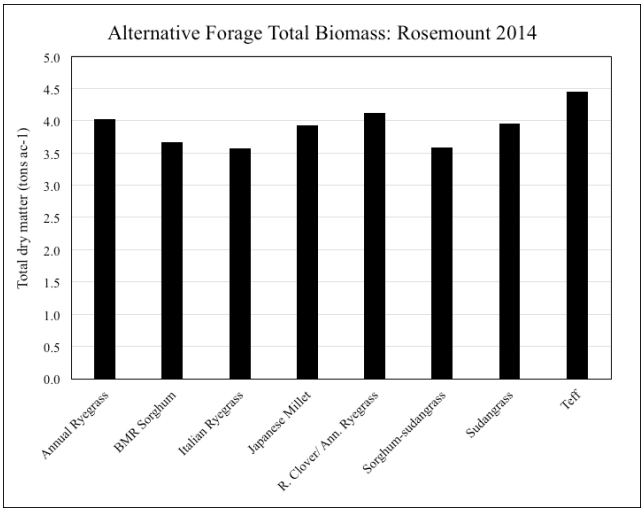

Figure 1. Average total dry matter yields from annual forage species in Rosemount, MN (2014).

In Rosemount, Teff achieved the greatest biomass, averaging 4.45 ± 0.15 ton ac^{-1} for total season production. Annual ryegrass, and red clover + annual ryegrass were also among the highest yielding treatments, but suffered greater weed pressure than teff (weed biomass is included in reported yields). Sorghum-sudangrass and Italian ryegrass were among the lowest yielding treatments (Figure 1). At the first cutting event, BMR sorghum was one of the highest producing treatments, but did not regrow under intensive cutting as well as most other warm-season forages. Similarly, in experiment 1, BMR yielded the greatest total biomass of all the grasses, producing over 7 tons ac^{-1} when allowed to grow all season and cut once. In experiment 1, nitrogen rate had no ef-

Table 3. Alternative annual forage management practices and average yields from multiple studies in Rosemount, MN.

Crop	Planting‡ (inches)	Harvest	Total DM (ton ac^{-1})	TDN
——————2002-2003——————				
Corn (81 day)	30	SH @ RM	5.9	63.6
Corn (95 day)	30	SH @ RM	6.7	62.9
Corn (103 day)	30	SH @ RM	7.0	65.4
BMR Sorghum	30	SH @ RM	6.0	55.7
Sudangrass	6	3 cuts	5.7	49.5
Sorghum-sudan	6	3 cuts	5.8	48.4
————————2013————————				
BMR Sorghum	6	SH @ RM	7.0	-
————————2014————————				
Teff	6	3 cuts	4.5	-
Annual Ryegrass	6	3 cuts	4.0	-
Sudangrass	6	3 cuts	4.0	-

‡ Treatments represented were planted ~June 1-15. Abbreviations: SH, Single Harvest.

Alternative Annual Forages (Continued from page 4)

Picture 1. Alternative forage crops in vegetative growth stages.

fect on forage biomass, indicating adequate residual alfalfa N and efficient utilization, although nitrogen rate did affect yield at all levels in experiment 2 (Table 2).

Field trials at Waseca experienced an extremely challenging growing season. A high percentage of alfalfa and weed regrowth following the initial glyphosate application required a second termination and planting event. A more successful alfalfa kill was achieved, but weed persistence remained an issue. Severe weed pressure, coupled with excessive rainfall in June and two hailstorms during the growing season, resulted in particularly adverse growing conditions. Preliminary observations indicate that teff, sudangrass, and BMR sorghum persisted the best under these conditions. All other treatments were lost to weed pressure. Teff competed exceptionally well, quickly establishing a thick, uniform stand and inhibiting weed encroachment. This weed suppression potential calls for further investigation in future studies, as percent weed cover in teff treatments was often up to 80-90% less than in other treatments.

Depending on production goals, timeframe, and seed cost and availability, best forage options may vary according to specific conditions. A previous study (2002-2003) concluded that corn silage is often the best option in terms of tonnage and nutritive value, even when planted as a late as July. Brown-midrib sorghum is highly competitive in biomass production, especially in one-cut systems, but generally has lower forage quality than corn. The prior research also established that, in multiple-cut (3) systems under favorable conditions, sudangrass and sorghum-sudangrass can produce competitive tonnage with higher crude protein, but lower energy than silage corn. General comparisons of these studies are provided in Table 3. Considering cutting tolerance and regrowth potential, the annual ryegrass options, sudangrass, and particularly teff could be more valuable in grazing (or haying) systems than corn silage, although direct comparisons between all of these grasses and corn have not yet been made. As the current research continues one more year, comprehensive assessments of biomass production and relative forage quality under varying management practices will provide producers with informed, decision making tools to implement alternative annual forages when needed.

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Sorghum-Sudangrass and Teff as Summer Forages for Livestock Systems

Pasture is the primary source of forage for grazing dairies, and for organic dairies, the National Organic Program livestock production regulations require a minimum of 120 days grazing per animal. In the northern United States, this requirement is typically met by a May–September grazing season, and profitability depends on pastures that provide a uniform, season-long supply of high quality forage. However, in the northern United States, seasonal variation in temperature and precipitation creates a challenge, as the predominant forage plants, which include perennial grasses such as Kentucky bluegrass and smooth bromegrass, and legumes such as white clover, undergo a “summer slump” in production. To create a more uniform and extended forage supply, research studies have recommended diversifying pasture systems to include warm season species in the summer. An approach to increasing diversity in a farm’s forage base is to combine annual and perennial crops in separate fields. An example for the northern United States, would be to use cool season

Sorghum–Sudangrass and Teff as Summer Forages for Livestock Systems (Continued from page 5)

grasses and legumes for forage in spring and early fall, and warm season annuals like teff and sudangrass for forage in summer. Grazing systems using these different approaches to achieve diversity require biological, environmental and economic analysis.

Table 1. Results for forage quality of BMR sorghum-sudangrass, teff grass, and cool-season grasses during 2013 at the University of Minnesota-WCROC dairy

Description (% of DM)	Grass Species		
	BMR Sorghum-Sudangrass	Teff grass	Cool-season grasses
Dry Matter	17.0	29.0	27.0
Crude protein	12.9	13.7	19.9
Acid-detergent fiber (ADF)	37.6	40.2	35.5
Nuetral dtergent fiber (NDF)	58.1	61.8	52.7
TTNDFD	53.9	46.4	52.5
Lignin	5.4	3.6	5.7
Sugar	6.3	5.8	7.3
Non-fiber carbo-hydrates (NFC)	18.8	14.1	18.1
Net Energy for lactation (Mcal)	0.56	0.53	0.59
Milk per ton	2476	2028	2450

Why should summer annuals be considered by livestock producers? They are very drought tolerant and can fill a gap in feed when other species experience the "summer slump". They are great emergency forages during dry weather and are multipurpose, so you can be use them for grazing, silage, or for baling.

During the summer of 2013, we planted two summer annuals for grazing for the first time at the University of Minnesota WCROC dairy in Morris. BMR Sorghum-Sudangrass and Teff grass were planted to extend our forage supply. These grasses were seeded with a drill on May 28, 2013.

BMR Sorghum-Sudangrass has increased in popularity due to the BMR gene and increased NDF digestibility (5-10% higher than regular sorghum-sudangrass). The plants have thick stems and are very leafy. Sorghum-sudangrass has moderate regrowth potential, but you should not graze or cut for forage until the plants are at least 18 inches tall to reduce prussic acid concentration. The ideal height for forage is 18 to 36 inches tall. When grazing sorghum-sudangrass animals should be moved so they leave 6 to 8 inches of stubble, but they might waste 20-30% of the forage through grazing. Lastly, sorghums and sudangrasses are luxury consumers of potassium, so they should not be used for dry cow forages. For seeding rate, we seeded our fields and pastures at 20 lbs/acre.

Teff grass is native to Northern Africa. Teff is drought tolerant and can be seeded into many different soil types. With this grass, you will have high yield with competitive forage quality, and will have rapid growth for 9 to 12 weeks. The seed is very, very small, and we seeded our pastures at 8 lbs/acre. Both of these annuals should be planted at 60 to 65 degree soil temperature and planted 1 to 1.5 inches deep. Perhaps, manure should be added as a fertilizer before planting because they have nitrogen requirements that are similar to corn.

The table has averages for forage quality of BMR sorghum-sudangrass, teff grass, and cool-season grasses during 2013. The cool-season species consist of mixtures of smooth bromegrass, or-

Sorghum–Sudangrass and Teff as Summer Forages for Livestock Systems (Continued from page 6)

chardgrass, red and white clover, and alfalfa. The dry matter of the sorghum-sudangrass was low because the cattle grazed the fresh forage in the early vegetative state. The summer annuals were not as high in crude protein as the cool-season grasses. However, with lower crude proteins, we probably improved nitrogen utilization of the milking herd. The ADF values of the grasses were very similar and are within the range of low 30's to mid-50's. All of these grass species were high in digestibility. The NDF levels were higher for the summer annual grasses compared to cool-season species. However, the total tract NDFD (TTNDFD) was lowest for the teff grass. TTNDFD is a measure of how much fiber is digestible, how fast the fiber digests, and how long a cow holds the fiber in the digestive system. The summer annuals were similar to the cool-season grasses for sugar and non-fiber carbohydrates, and they provided similar net energy for lactation and milk per ton as the cool season grasses.

Remember, sorghum-sudangrass and teff grass are not replacements for cool-season forages, but should be added to a forage program to compliment the cool-season grasses. If there is a drought or dry weather, these two forages may prevent us from having to buy expensive hay during a drought.

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Stand Age Affects Alfalfa Nitrogen Credits to First–Year Corn

Alfalfa typically contributes large amounts of N to subsequent corn crops. The size of this N contribution is affected by the age of alfalfa stands at termination; however, alfalfa stand age is not used in current university guidelines. Most guidelines are based on stand density at termination and corresponding book-value N credits that should be subtracted from guideline rates for corn following corn.

In order to better understand how alfalfa stand age affects N availability and the fertilizer N requirements of first-year corn, field trials were conducted at Lamberton and Waseca, MN over three years. In each year, no-tillage corn was grown following fall-terminated 1-, 2-, and 3-year-old alfalfa stands. Fertilizer N was applied to corn at planting as broadcast ammonium nitrate. In nonfertilized plots, soil nitrate-N + ammonium-N in the 0- to 2-ft depth and corn N content were measured at the 6-leaf (V6), 10-leaf (V10), and silking (R1) corn growth stages. Corn grain yield was determined at 'black layer' and the economic optimum N rate (EONR) was calculated at $0.35/lb N and $3.50/bushel corn.

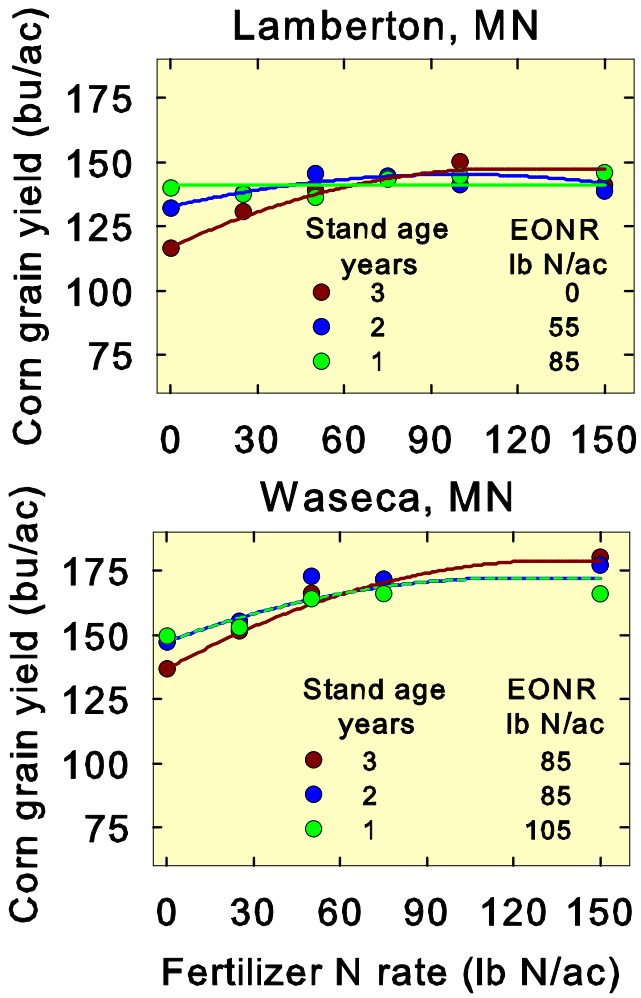

Figure 1. The response of corn grain yield to fertilizer N for first-year corn following 1- to 3-year-old alfalfa stands. EONR, economic optimum N rate.

All three stand ages at both locations had stand densities at termination greater than 4 plants/sq ft, except in one case (3-year-old stands at Waseca in one year). Therefore, almost all stands qualified for the highest N credit of 150 lb N/acre from University of Minnesota guidelines. With this credit, guidelines indicate that less than 10 lb N/acre would economically optimize corn grain yield. However, on medium

Stand Age Affects Alfalfa Nitrogen Credits to First–Year Corn (Continued from page 7)

-textured soil at Lamberton, only first-year corn following 3-year-old stands needed no N fertilizer, whereas the corn following 2- and 1-year-old stands required 55 and 85 lb N/acre, respectively. In contrast, on fine-textured soil at Waseca, first-year corn required 85 lb N/acre following both 2- and 3-year-old stands and 105 lb N/acre following 1-year-old stands. Therefore, stand age should be considered when utilizing alfalfa N credits because first-year corn following 1- or 2-year-old stands can often require N even though stand densities are high. The greater N contribution of 3-year-old stands relative to younger stands may be due to soil quality enhancements because stand age had no or minimal impacts on soil nitrate-N + ammonium-N content and corn N uptake during the V6 to R1 corn growth stages (data not shown). This demonstrates that stand age effects on first-year corn N requirements are difficult to detect with early-season soil and plant N indicators, so improved predictions are necessary. Our ongoing efforts are focused on developing field- and site-specific predictions of when and to what extent corn following alfalfa will respond to N, using combinations of crop management practices, soil characteristics, and weather conditions.

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Winter feeding tips for horse owners

Cold temperatures will increase a horse's energy requirement as the need to maintain core body temperature increases. The temperature below which a horse needs additional energy to maintain body warmth is called the lower critical temperature. The lower critical temperature for a horse is estimated to be 41˚F with a summer coat and 18˚F with a winter coat.

Energy needs for a horse at maintenance increase about 1% for each degree below 18˚F. For example, if the temperature is 0˚F, a 1,000 pound idle, adult horse would need an approximately 2 additional pounds of forage daily. It is best to provide the extra energy as forage. Some believe that feeding more grain will help keep a horse warmer. However, not as much heat is produced as a by-product of digestion, absorption, and utilization of grain as is produced from the microbial fermentation of forage. Most da-

ta suggest that the need for other nutrients do not change during cold weather. However, consider feeding loose salt instead of block salt, as horses may not want to lick cold salt blocks during winter months.

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Pasture rental and lease agreements

Pasture rental and lease arrangements offer livestock producers the opportunity to affordably start or expand their operations and limit financial risk. With the high price of grains and the growing interest in grass fed beef and dairy; managed productive pastures offer an alternate and affordable way to feed cattle. Sheep and goats have traditionally been fed a mostly forage diet but managing their pasture will lead to greater profitability. On the other hand, renting out pastures may allow a landowner to gain income while helping a beginning farmer the chance to get established.

What is the difference between a rental agreement and a lease for a pasture rental? Although lease and rental agreement are often used interchangeably, they are not the same. Lets explore the differences.

Rental agreements are month to month, with no set period of residence. At the end of each 30-day period, both the land owner and the tenant are free to change the rental agreement (subject to rent control laws). These changes may include increased rent for the pasture, changing the terms of the initial agreement, or asking the tenant to vacate the property. However, in most states, both landlord and tenant are required to give 30 days notice before any changes can be made. If your state doesn't require notice, changes to rental agreement can be made at the landlord's discretion. A rental agreement typically renews automatically after each 30-day period has

Pasture rental and lease agreements (Continued from page 8)

elapsed. There is no need to give notice about this automatic renewal, as long as neither both parties are in agreement.

A **lease** has a set term, such as six months or a year, during which the tenant agrees to rent the property. During that time (also known as the duration of the lease), the tenant and the landlord must adhere to the agreement. For example, tenants agree to make monthly rent payments and follow any code of conduct or other stipulations in the lease.

Neither party can change any terms of the agreement until the lease expires, unless both parties agree to the change. A tenant cannot vacate the property without breaking their lease, in which case they can be held liable for the rest of the rent due under the lease, or can be required to find someone else to take over the lease.

Amount to pay or amount to charge: Deciding the appropriate monthly rental rate depends on several factors. The renter must determine expected gains or profits from the utilization of the land. Typically the caring capacity of the rented parcel (i.e. animal units per acre) will aid in determining the fair rental rate for both parties involved. Management of the pastures can greatly influence stocking rates; for example, pasture managed as continuously grazed system will have difffernt stocking rates when compared to rotational grazing system comprised of smaller paddocks whereas mob grazing system can support high-densities. Land with the promise of greater gains (i.e. milk, fiber, or muscle) will greatly influence rental rates. Typically, most pastures are rented by the month on a per acre or per head basis. An alternative is to consider an amount of gain in a season. Two very important items that must be agreed upon are the maximum number of animals allowed on a unit of land and the weight of the animals. Stocking rates and the weight of the animals will greatly impact the stand life of the pasture and soil that supports the pasture (i.e. soil health). If you rent on an acre basis, you may overstock to reduce cost per head. If you rent on a per head basis, you may want to lower your stocking rate to improve rate of gain. These decisions might be in conflict with the landowner's expectations. The devil is in the details, all the details most be discussed and agreed upon by both parties before entering the lease or rental agreement.

Consider some different scenarios: You have a 75 cow beef herd and expect you will have 75 cow/calf pairs to put on pasture May 1. You hear of a pasture available to lease for the year for $15,000 for 100 acres. Is this a fair price? In the past you have paid $1/cow/calf unit per day for pasture rental. If we can expect 180 days of pasture growth adequate to support the 75 cow/calf units; our math would tell us that would equal $75/day in pasture costs for 180 days which would equal $13,500. If you pay the $15,000; the cost comes out to $83.33/day or $1.11per cow/calf unit per day.

In the second case, you have 75 bred Holstein heifers that you want to gain at least 1.75lbs/head /day by calving time in the fall. In order to achieve this rate of gain, it will be necessary to divide the pasture into 30 paddocks with movable electric fencing which you will have to provide. It will also require you to move fences and animals daily. The alternative is the landowner offers to custom raise the heifers for $2.50/head/day. However, there is no guarantee of rate of gain. The above scenarios serve to illustrate issues that need to be considered in negotiating a pasture lease.

Questions every landlord and tenant should ask: What is the forage production potential of the pasture? Is it composed of diverse and productive grasses and forbs or weedy Kentucky Blue grass? What is the fertility status of the ground and who will be responsible for the additional fertilizer needed? What is the soil type? Is it sandy or rocky with little water holding capacity? What is the water supply and quality in the pasture and the location of the water source? Will different fencing plans work with the water available? What happens if the water supply dries up in late summer? Who is responsible to provide water?

Whether it is a rental agreement or a true lease, it should be put in writing with the guidance of legal counsel. Names of the people involved, legal description of the land involved, length of the agreement, pay provisions and all the items agreed upon. It should then be signed and dated.

There are other fact sheets in this series that address other issues in pasture use.

http://www.extension.umn.edu/agriculture/dairy/grazing-systems/

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