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## Open House/Horticulture Day - Wednesday, August 30

We have decided to combine our popular Horticulture Day/Garden Tour with an Open House for the general public. We are expanding our program to accommodate visitors who desire an opportunity to see and experience a broader range of activities in their visit to their experiment station. In addition to the traditional garden tours, visitors will have an opportunity for a wagon tour of the station with a brief stop in the forestry and agronomy research areas. Tours will start at 3:00 pm and the last tour will depart about 6:00 pm.

We invite you to come and spend an afternoon at your experiment station. Lunch will be available from 4:30 to 6:30 pm. The wagon tours will last about one hour and the garden tours will take about an hour and a half. Visitors who choose will have time to do both tours and still have time for lunch. We would like to issue a special invitation to our urban friends from cities and towns throughout Minnesota to join with the producers of food and forest products to share those things which have contributed to the quality of life in our country. An abundant supply of

raw material for our nation's food and wood product industries does not occur by magic. The abundance we enjoy is the product of the hard work and ingenuity of America's farmers and timber producers coupled with investment in a system of research at land grant universities that has pro-

vided the technology needed to meet increasing demands for low cost, high quality wood and food supplies.

We invite everyone to join their friends and neighbors at the North Central Experiment Station on August 30, 3:00 - 7:00 pm, to celebrate our shared abundance.

## Harvest Management of Perennial Cool Season Grasses and Alternative Legumes

Russell D. Mathison, Agronomist

Cool season grasses and alternative legumes have the potential to be very productive in many forage-based livestock systems. Properly managed, grass or grass/legume hay can supply nearly all of the nutrient needs of many classes of livestock.

Management starts with selecting the correct species for a particular site and use. Species vary in their adapt-

ability to soil fertility, pH and moisture, and in their response to harvest method and frequency. Tables 1 and 2 describe many of the traits and growth characteristics of the cool season grasses and alternative legumes best suited for Minnesota. These should be a good reference for selecting a species or mixture.

Harvest management affects forage

dry matter yield, quality and stand persistence. Properly managed cool season grass species and some alternative legumes have the potential to produce dry matter yields similar to alfalfa. Like alfalfa, they achieve maximum dry matter yield well into the reproductive

Table 1. Evaluation of the Characteristics of Several Cool Season Grass Species

	Orchard grass	Reed canary grass	Brome grass	Tall fescue	Timothy	Kentucky blue- grass
East of establishment	1 <sup>1</sup>	2	3	1	1	3
Maturity	E	M	M	E	E	E
Winter hardiness	3	1	1	3	1	1
Rate of regrowth following cutting or grazing	1	3	3	1	3	1
Tolerance of wet conditions	3	1	3	3	2	3
Palatability as pasture	1	2	1	2	1	1
Drought tolerance	3	2	1	3	5	5
Early spring pasture	1	3	3	2	1	2
Fall pasture	2	3	3	1	3	3
<u>Compatibility in legume- grass mixtures:</u>						
Alfalfa-grass	3	2	1	3	3	3
Red clover-grass	2	1	2	2	1	3
Birdsfoot trefoil-grass	3	3	2	3	1	1

1=Good; 3=Fair; 5=Poor

E=Early; M=Medium

Source: *Proceedings of the 15th Annual MN Forage Day, MN Forage and Grassland Council, 1990, p. 58.*

Forestry, Agronomy, Wild Rice and Garden Tours 3:00 - 7:00 pm • Lunch 4:30 - 6:30 pm

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Current information available from University of Minnesota Extension: <http://www.extension.umn.edu>.

stages of growth. However, cool season grasses begin to lose forage quality long before they reach maturity, and, as maturity progresses, forage quality declines rapidly (Table 3). The rapid quality decline starts sometime during the early heading stage, so it is a generally accepted practice when managing grasses for maximum dry matter yield to harvest from the boot stage (when the head is still enclosed in the flag leaf) to the early heading stage (when approximately 10% of heads have emerged from the flag leaf sheath). Other

trefoil, especially, retains excellent forage quality with advanced maturity, making it an excellent species for "stockpiling" or accumulating forage in place for use in periods of low production from other species.

Red clover and birdsfoot trefoil are usually better adapted to low fertility soils than alfalfa. They tolerate lower soil pH, and thus are more economical to grow because lime is not required. However, red clover and birdsfoot trefoil have greater productivity if fertilized and grown at soil pH of 6 to 7. Soil testing is recommended, as is

species like Reed canarygrass and orchardgrass, which regrow from food reserves stored in stem bases. They need a short rest period (25-30 days) between defoliations to replenish stored food reserves. Smooth brome-grass and timothy are the cool season grass species most sensitive to defoliation frequency. Defoliation during the stem-elongation (jointing) stage of growth can reduce seasonal yield and stand persistence. All or most of the growing tips of the young stems are removed by close clipping or grazing at this time, so that recovery growth

Table 2. Characteristics of perennial legumes +

Legume	Tolerance to:							
	Heat/drought	Wet	Winter hardiness	Frequent cutting/grazing	Salinity	Acidity	Seedling Vigor	Ruminant bloat inducing
Alfalfa	E	P	E	F	P	P	F	Yes
Birdsfoot Trefoil	G	G	G	G	F	G	P	No
Crownvetch	G	P	F	P	F	G	P	No
Cicer milkvetch	G	F	E	G	G	F	P	No
Sweet clover	E	P	E	P	P	F	F	Yes
Red clover	F	F	F	P	p	F	G	Yes
White clover	P	F	P	P	P	F	F	Yes
Alsike clover	F	G	P	P	P	G	G	Yes
Kura clover	P	F	E	E	F	F	P	Yes

+E=excellent; G=good; F=fair; P=poor

Source: Proceedings of the 15th Annual MN Forage Day, MN Forage and Grassland Council, 1990, p. 50.

Table 3. Forage quality of perennial grasses cut at seed (2 cuts/yr, 60 days between cuttings), heading (3 cuts/yr, 45 days between cuttings) and vegetative (4 cuts/yr; 30 days between cuttings) stages in Southern Minnesota (St. Paul).<sup>1, 2, 3</sup>

Grasses	2-cut management(%)			3-cut management(%)			4-cut management(%)		
	CP	NDF	DDM	CP	NDF	DDM	CP	NDF	DDM
Baylor smooth bromegrass	10.8	62.9	54.8	13.5	59.9	60.8	17.9	52.6	69.8
Orion orchardgrass	11.7	61.7	58.7	13.4	57.7	66.4	16.8	52.6	70.6
Rise reed canarygrass	12.6	61.7	54.2	14.6	59.9	58.0	18.1	54.6	65.9
Venture reed canarygrass	11.9	62.8	52.5	13.2	61.8	57.8	18.4	54.0	66.8
Palaton reed canarygrass	12.9	61.4	54.8	13.6	60.1	59.1	18.4	54.3	66.4
LSD (0.05)*	1.2	1.9	2.3						

<sup>1</sup>Sheaffer et al., 1990. Journal of Production Agriculture

<sup>2</sup>Grasses fertilized with 150 lb N/acre in the spring.

<sup>3</sup>CP=crude protein; NDF=neutral detergent fiber; DDM=digestible dry matter

\*LSD: for statistical separation of CP, NDF and DDM means within and over cutting managements.

Source: MN Agricultural Experiment Station Bulletin 595, 1990. Reed Canarygrass, p.6.

forage quality or management considerations may suggest harvest at earlier stages of maturity, but harvesting at stages later than the boot stage or early heading results in forage of low value to most livestock. Forage yield of red clover and birdsfoot trefoil increases with maturity as well. However, they do not decline in forage quality as rapidly with increased maturity as does alfalfa, thus offering somewhat more flexibility in harvest management for maximum dry matter yield. Birdsfoot

fertilization with nutrients and lime as needed.

The regrowth response of a forage after defoliation is determined by its method of regrowth. Low growing species such as Kentucky bluegrass, tall fescue and birdsfoot trefoil maintain a fairly substantial leaf area below cutting or grazing height. Regrowth is partially fueled by photosynthesis of this leaf material. These species tend to regrow faster and tolerate more frequent defoliations than more erect

must come from buds at the crown, which may not be sufficiently developed to initiate growth or they initiate growth slowly. Also, food reserves are at a low level. Red clover has a reputation for being productive for only two years under a two-cut harvest system. This lack of persistence is the result of susceptibility to disease, not cutting frequency. Data from Table 4 indicates new red clover varieties may have potential or more long-term stand persistence, even under a three-cut management system.

Grasses require sufficient amounts of nitrogen for maximum dry matter yield and to improve forage quality. Other nutrients, such as potassium, phosphorous, or sulfur may also be necessary in some cases, but nitrogen is the plant nutrient that can produce the most beneficial results. (Nitrogen fertilizer recommendations for grass hay and pasture are available in MN Extension Service Bulletin BU-6240-E, 1993.) Grasses are often grown in mixtures with nitrogen-fixing legumes to minimize or eliminate the need to add nitrogen fertilizer. Current recom-

Table 4. Forage yield (tons per acre) and final stands (percent) of red clover varieties at Grand Rapids, Minnesota<sup>1</sup>

Variety	Forage Yield							
	1990		1991		1992		June 9, 1992	
	3-cuts	2-cuts	3-cuts	2-cuts	3-cuts	2-cuts	3-cuts	2-cuts
Atlas	1.88	2.78	2.45	2.65	1.24	2.17	79	93
Arlington	1.54	2.00	1.65	1.67	0.67	1.28	18	59
Flores	1.98	3.29	2.55	2.84	1.13	2.30	73	91
Lakeland	1.96	3.26	2.12	2.87	0.80	1.89	54	90
Marathon	2.36	3.20	2.97	2.72	1.77	2.33	86	90
Prosper I	1.89	3.21	2.33	2.80	1.09	2.28	58	95
Average	1.94	2.97	2.34	2.59	1.12	2.04	61	89

LSD (0.05)

0.45

0.41

0.35

16

<sup>1</sup>Legumes established in 1989 and cut on June 20, July 25, September 15 (for 3-cuts); or cut June 28 and August (for 2-cuts).

Source: MN Agricultural Experiment Station Bulletin 597, 1993, Forage Legumes, p.31.

# Tourism Business Retention & Expansion Program Developed

Dan Erkkila, Tourism & Travel Specialist

Year after year, statistics show tourism and travel activity growing tremendously worldwide. Nearly 476 million travelers made up total international tourism arrivals in 1992, generating gross tourist receipts of \$279 billion (exclusive of passenger fares). Roughly seven percent of world trade came from international travel expenditures, positioning tourism among the top three trade items internationally. Estimates of global employment in tourism suggest nearly 100 million service workers, clearly establishing tourism as a major force in the world economy. In the United States, the picture is similar: over \$320 billion in tourism and travel receipts and \$99.2 billion in payroll for 1992.

Concerted effort has been made for tourism and travel growth in the United States to spread to the rural areas of the country. There, it is put forward as a regional economic development strategy. While agriculture is still a dominant industry in rural America, structural change has meant that agriculture creates a dependency in only 400 of the 2400 counties in the United States. Farm employment has dropped from 14.4 percent to 7.6 percent over the last 20 years and many rural areas have also experienced a decline in forestry or extractive industries like mining and oil. Communities have sought tourism to help in the diversification of local economies experiencing change. Now, the largest share of rural jobs and employment growth has come from the service sector — employing over half of all rural workers.

Even if a rural area has ample natural amenities, it faces several major bottlenecks when it attempts to move into tourism. First, the nature of tourism businesses is different than many other small businesses and new owner/operators often lack the necessary skills and knowledge to successfully operate a tourism business. Second, the success of tourism busi-

nesses is inter-locked with a variety of related retail and service businesses. As a rural economy changes, the shifts in these component parts may not progress in the proper balance. Third, small tourism businesses depend heavily on the reputation of the region and regional marketing efforts. These require a community consensus on image, marketing methods, and funding options. Fourth, tourism businesses, as with any industry, face a variety of local, state, and federal regulations. Learning to live with and influence these codes requires collaborative effort between community leaders and many small tourism business owners.

A further complication in efforts to shift the focus to a growth industry such as tourism is the need for area-wide collaboration for promotional efforts, planning efforts, and educational programs. Building this collaboration requires a common understanding of the problems and issues and a means of building consensus among a wide range of community leaders. Business retention and expansion (BR & E) programs are a partial solution to this problem.

Simply put, BR & E visitation programs are action-oriented strategic planning programs aimed specifically at the needs of existing businesses. Begun in the early 1960's, BR & E programs started largely as public relations endeavors. Strategic planning concepts were added to these programs in the mid-1980's. Since then, the retention and expansion of existing businesses has become a widely accepted model for encouraging community economic development. Even though these revised BR & E visitation programs have been highly successful, nearly all early BR & E visitation projects focused on manufacturing firms or a mixture of manufacturing and service sector firms. The University of Minnesota has created the first of its kind tourism BR & E,

in addition to agricultural applications and consideration of a retail sector program.

The University's BR&E visitation program process begins with a certified BR & E consultant coaching a community as they establish a team of four local leaders to coordinate the program. Each person on the leadership team has specific responsibilities for different stages of the program than spans 8-9 months. This team recruits twenty-five additional local leaders representing the business community, local governments, educational institutions, and economic development professionals, to serve on the BR&E task force. This group makes the major early policy decisions (e.g., what types of firms to interview and how many) and also recruits volunteer visitors to help with firm visits. After the data is collected and tabulated, the task force also makes decisions on which action programs the community will undertake to help existing firms. Generally, about 80 to 100 local firms are visited, based on a random sample of the firms in the area. Questions are asked about their plans for expansion, contractions, or closures; bottlenecks to planned expansions; needs for information; and evaluation of local government services.

After the data is collected, local leaders review the surveys to see if there are any obvious immediate local business issues that can be handled locally. Meanwhile, the University analyzes the aggregate results from the survey process and develops suggested recommendations on the long-term strategies that the community or region could undertake in response to the concerns raised by the firms visited. The results are shared with the task force and, after reviewing the research results, the group sets priorities for future BR&E activities.

Specific objectives of local BR&E visitation programs are: 1) to demon

strate the community's pro-business attitude to existing local firms; 2) to assist local businesses in becoming more competitive and efficient by helping them use state and federal programs designed for this purpose; 3) to assist existing firms in solving problems with local governments; 4) to provide an early warning system for plant closures or expansions; and 5) to provide data for strategic planning in economic development.

In most communities there are more alternative ways of helping tourism

firms improve their competitiveness in the regional or national market than it is feasible for the community to sponsor. As a consequence, the community must set priorities on those BR&E programs that will have the greatest impact. By visiting local firms and collecting data on their concerns, the BR&E process provides the data necessary to set these priorities. Typically, the data is collected around the following economic development strategies:

- helping local travel and tourism businesses

obtain information on state and federal programs that help improve their competitiveness and profitability;

- identifying ways to better promote the county's travel and tourism businesses;
- examining alternative options for developing and funding a county-wide tourism organization; and
- creating a regional tourism development and promotion program.

To date, tourism BR&E programs have been completed in Cass and Crow Wing counties, with one currently underway in Itasca. For more information about the BR&E program, contact Dan Erkkila at (218) 327-4361.

## News from North Central

David L. Rabas, Station Head

As I write this article in early June it is very dry, but rain or the promise of rain is on the horizon. Dry weather in May allowed our farm crew to get most of their spring work done on time in spite of several equipment breakdowns. Lost time from breakdowns due to aging equipment will become an increasingly common problem at NCES as annual budget cuts leave little resources for equipment replacement. Like just about everyone else in agriculture we are having to make do with less.

I would like to take this opportunity to welcome two new employees to North Central. Linda Erickson joins our staff as a three-quarter time Senior Secretary replacing Carolyn Frings who recently retired. Linda has a BA degree in business management from the College of St. Scholastica with a minor in accounting. She has excellent typing and computer skills and will work with our business office and research staff. We welcome

Linda to our NCES support staff.

Jim Schmitt has joined our staff as an Assistant Farm Animal Attendant. Jim fills a livestock research support position which has been open for about two years. Jim had worked part time in the livestock area. The arrival of our Animal Scientist, John Hall, the increasing size of our beef herd and expanding research plans required an addition to our livestock support staff. We welcome Jim to our NCES research staff.

This summer we will be joined by four Minnesota science teachers who will serve as three week "assistant scientists" with four members of our research faculty. The program is a partnership between Minnesota Agriculture in the Classroom and the University of Minnesota Agricultural Experiment Station. The purpose of the program is to promote the science of agriculture among middle school and high school science educators. We look forward to a productive and rewarding

experience for faculty and summer scientists.

I would like to extend a special invitation to our readers to attend the Open House/Hort Day on Wednesday, August 30. Come early and spend the afternoon enjoying a tour of your experiment station.

Our NCES Centennial celebration is one year away. Our oldest branch experiment station, the N.W. Experiment Station at Crookston will celebrate its Centennial on July 19. We hope some of our readers can join them on this important day.

### UPCOMING EVENTS

Wild Rice Growers Day - Aug. 1, 1995

Open House/Hort Day - Aug. 30, 1995  
3:00 - 7:00 pm

Livestock/Forage Day - Sept. 6, 1995  
(If raining on the 6th, Sept. 7 alternate date - watch for news media in mid-August w/details)

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