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University of Nebraska Lincoln

Organic Matter — Should It Matter? A Golf Course Perspective

by Roch Gaussoin, Department of Agronomy and Horticulture, UNL

The Golf Course Superintendents Associations of Nebraska, South Dakota and Peaks and Prairies (Montana) have and continue to generously support research at the University of Nebraska investigating organic matter (OM) management in golf greens. Currently there are two projects underway. Chas Schmid, a South Dakota native, is the graduate student working on these projects.

The first, titled "Influence of root-zone organic matter on putting green quality and performance," is using existing golf courses with a consistent maintenance history and a robust statistical survey technique to quantify national and regional root zone OM relationships to site-specific maintenance and overall green quality. Chas has traveled from the West to East Coast sampling golf course greens. He has concentrated in the central US in Nebraska, South Dakota and Wyoming, and will be scheduling a "road trip" involving Montana and Idaho in the near future. In 2006, 700 samples were collected from 70 different golf courses in nine states (NE, SD, IA, WY, CO, WA, WI, IL, and NJ). While visits are continuing, we can share some of the more interesting ***preliminary*** results at this time. These data are preliminary in that statistics and sampling quantity need to be completed before relevant conclusions can be made. As expected, courses that were topdressed with more sand and more frequently had lower OM in their greens (Figure 1). Cultivation frequency also affected OM (Figure 2). In our survey of management practices provided by the superintendent, we neglected to ask what methods of cultivation were used, i.e., needle tine, traditional coring, solid tine, etc. We are now in the process of gathering that information. It stands to reason, however, that the first two bars in Figure 2 represent a combination of methods and not simply core aerification by itself. Cultivar differences appeared to defy conventional wisdom (Figure 3). The newer, denser bents, which have been indicted for supposedly increasing OM levels, do not necessarily have higher OM than more traditional cultivars like Penncross. This observation was further confirmed by samples taken from the on-site bentgrass trial at North Shore Country Club in Illinois (special thanks to Superintendent Dan Dinelli, CGCS, for letting us sample the trial) (Figure 4).

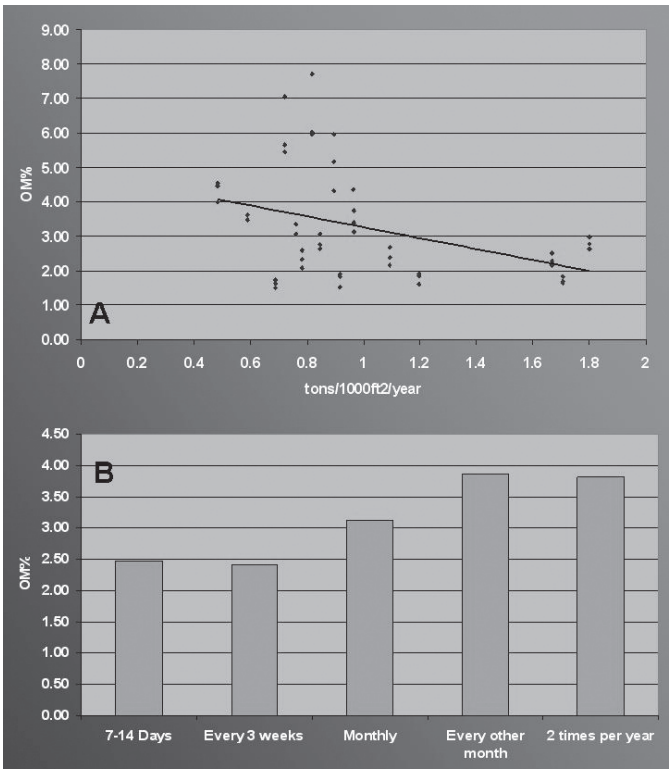

Figure 1. Sand topdressing quantity (A) and frequency (B) and organic matter content of greens sampled in 2006 from nine states.

The objectives of the second study are to determine (1) if conventional hollow tine is more effective than solid tine aerification at managing organic matter accumulation, and (2) what less invasive cultivation (LIC) methods are the most effective at

(continued on page 4)

IANR

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The Center for Grassland Studies is a unit within the University of Nebraska–Lincoln Institute of Agriculture and Natural Resources. It receives guidance from a Policy Advisory Committee and a 50-member Citizens Advisory Council. This newsletter is published quarterly.

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From the Director

We have seen and heard much information recently about alternate, renewable and biofuels. The Renewable Fuels Standard target of 7.5 billion gallons established for 2012 and mandated by the Energy Policy Act of 2005 is expected to be exceeded. President Bush, in his 2007 "State of the Union" address, indicated that the nation should replace 20% of its predicted fossil fuel use by the year 2017. This would require several million additional gallons of biofuels.

The rapid increase in production and use of biofuels affect agricultural markets, local communities, consumer prices and environmental quality. Among renewable energy sources, bioenergy derived from plant materials (mostly corn) has been one of the most rapidly growing sectors of our economy. There is need to keep an appropriate balance among food, feed and fuel production as well as environmental quality.

Increasing concern has been expressed about the impact of using corn for ethanol on the availability and price of food products made from corn, and the resulting impact on soil erosion and conservation practices with more marginal land being plowed and planted to corn for fuel production. However, the use of perennial plants, especially grass, whereby only the tops are harvested and the stubble and roots remain intact, eliminates most of those concerns.

Most of the ethanol currently being made in the United States is from corn. Switchgrass (*Panicum Virgatum*) is being mentioned and studied more and more as a potential source of carbohydrates for the manufacturing of ethanol. When using switchgrass to make ethanol, complex carbohydrates would first need to be converted to sugars and then to ethyl alcohol. Thus, harnessing cellulosic biomass for ethanol production will require the development of economically feasible technologies that can break down cellulose into sugars, which are then converted to ethanol.

Switchgrass is a warm-season native perennial grass that has largely been used for forage or prairie restoration in years past. It has been identified as a plant with high potential for feedstock in ethanol production. The use of high-producing perennial grasses, such as switchgrass, would greatly expand the potential for producing energy feedstock.

Ken Vogel, a scientist with the USDA Agricultural Research Service, and his colleagues located at UNL have recently published some exciting information relating to the use of switchgrass as a feedstock for ethanol production (see article on facing page). They conducted experiments with switchgrass on large-scale plots which showed that ethanol produced from switchgrass yielded 540% of the energy used to grow, harvest, and process it into ethanol. They also reported that using a conservative conversion factor, they could obtain 300 gallons per acre of ethanol from switchgrass compared to 350 gallons from corn.

Presently, the United States consumes 25% of the world's total oil production, whereas we produce only 46% of what we use. With our country being so energy dependent on others, there is always the concern that a country which does not agree with our policies could take voluntary and unilateral action to refuse to sell oil to us. Therefore, it is vitally important that we rapidly develop an alternate and plentiful source of renewable and sustainable energy which does not compete for food and feed production or severely damage the environment. Perennial grasses may provide one of the best options for achieving that goal.

M. A. Massengale

UNL-USDA Study: Major Net Energy Gain from Switchgrass-based Ethanol

Switchgrass grown for biofuel production produced 540 percent more energy than needed to grow, harvest and process it into cellulosic ethanol, according to estimates from a large on-farm study by researchers at the University of Nebraska-Lincoln.

Results from the five-year study involving fields on farms in three states highlights the prairie grass' potential as a biomass fuel source that yields significantly more energy than is consumed in production and conversion into cellulosic ethanol, said Ken Vogel, a U.S. Department of Agriculture-Agricultural Research Service geneticist in UNL's agronomy and horticulture department.

The study involved switchgrass fields on farms in Nebraska, North Dakota and South Dakota. It is the largest study to date examining the net energy output, greenhouse gas emissions, biomass yields, agricultural inputs and estimated cellulosic ethanol production from switchgrass grown and managed for biomass fuel.

"This clearly demonstrates that switchgrass is not only energy efficient, but can be used in a renewable biofuel economy to reduce reliance on fossil fuels, reduce greenhouse gas emissions and enhance rural economies," Vogel said.

The joint USDA-ARS and Institute of Agriculture and Natural Resources study also found greenhouse gas emissions from cellulosic ethanol made from switchgrass were 94 percent lower than estimated greenhouse gas emissions from gasoline production.

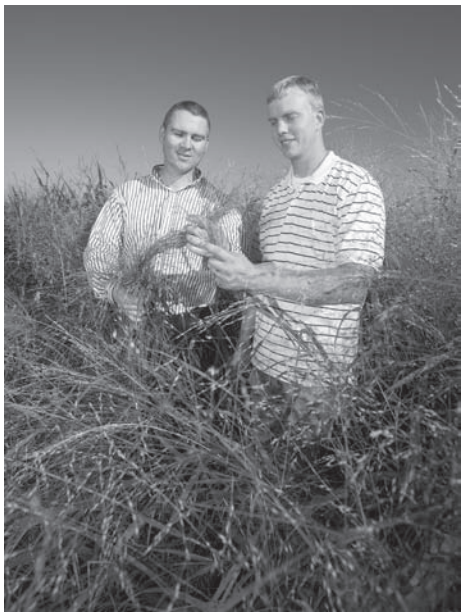
Researchers reported their findings in this week's (Jan.7-11) Proceedings of the National Academy of Sciences. The research paper is available online (www.pnas.org, search on the word switchgrass).

In a biorefinery, switchgrass biomass can be broken down into sugars including glucose and xylose that can be fermented into ethanol similar to corn. Grain from corn and other annual cereal grains, such as sorghum, are now primary sources for U.S. ethanol production.

In the future, perennial crops, such as switchgrass, as well as crop residues and forestry biomass could be developed as major cellulosic ethanol sources that could potentially displace 30 percent of current U.S. petroleum consumption, Vogel said. Technology to convert biomass into cellulosic ethanol is being developed and is now at the development stage where small commercial scale biorefineries are beginning to be built with scale-up support from the U.S. Department of Energy.

This study involved 10 fields of 15- to 20-acres each with four in Nebraska near Atkinson, Crofton, Lawrence and Douglas; four in South Dakota near Highmore, Bristol, Huron and Ethan; and two in North Dakota near Streeter and Munich. Trials began in 2000 and 2001 and continued for five years. Farmers were paid for their work under contract with UNL and documented all production operations, agricultural inputs and biomass yields. The researchers used this information to determine the net energy estimates.

Switchgrass grown in this study yielded 93 percent more biomass per acre and an estimated 93 percent more net energy yield than previously estimated in a study done elsewhere of planted prairies in Minnesota that received low agricultural inputs, Vogel said. The study demonstrates that biomass energy from perennial bioenergy crops such as switchgrass can produce significantly more energy per acre than low input systems. Less land will be needed for energy crops if higher yields can be obtained.


Agricultural Research Service, USDA

Rob Mitchell (left) and Marty Schmer examine switchgrass being grown in one of the research fields.

Researchers point out in their study that plant biomass remaining after ethanol production could be used to provide the energy needed for the distilling process and other power requirements of the biorefinery. This results in a high net energy value for ethanol produced from switchgrass biomass. In contrast, corn grain ethanol biorefineries need to use natural gas or other sources of energy for the conversion process.

In this study, switchgrass managed as a bioenergy crop produced estimated ethanol yields per acre similar to those from corn grown in the same states and years based on statewide average grain yields.

"However, caution should be used in making direct ethanol yield comparisons with cellulosic sources and corn grains because corn grain conversion technology is mature, whereas cellulosic conversion efficiency technology is based on an estimated value," Vogel said.

Vogel said that he does not expect switchgrass to replace corn or other crops on Class 1 farm land. He and his colleagues are developing it for use on marginal, highly erodible lands similar to those currently in the Conservation Reserve Program. All the fields in this study met the criteria that would have qualified for this program. Using a conservation cellulosic conversion value, researchers found that switchgrass grown on the marginal fields produced an average of 300 gallons of ethanol per acre compared to average ethanol yields of 350 gallons per acre for corn for the same three states.

The researchers point out that this was a base-line study. The switchgrass cultivars used in this study were developed for use in pastures. New higher yielding cultivars are under development for specific use in bioenergy production systems.

Switchgrass yields continue to improve, Vogel said. Recent yield trials of new experimental stains in the three states produced 50 percent higher yields than achieved in this study.

"Now, we really need to use an Extension effort to let farmers know about this new crop," Vogel said.

Richard Perrin, UNL agricultural economist, was the primary economic analyst for this study. Other authors were Marty Schmer, USDA-ARS agricultural science research technician and UNL doctoral student, and Robert Mitchell, USDA-ARS agronomist at UNL.

Decades of switchgrass research at UNL put scientists in the position to start studying the crop as a biomass energy source in 1990.

"UNL and the USDA-ARS have been pioneers in switchgrass research since the 1930s, domesticating it as a pasture grass," Vogel said.

Vogel has led research to develop switchgrass cultivars for biomass production. The UNL-USDA team also has developed recommendations for how best to manage switchgrass to maximize biomass yields.

Future research will include further studies of improving management practices including work on improving establishment and harvesting methods, improving biomass yield, and improving conversion efficiency and net and total energy yields, Vogel said.

Switchgrass in this study employed UNL's best management practices for switchgrass, including no-till seeding, herbicides, weed control and adaptive cultivars. This study was also based on farm fields up to 20 acres instead of smaller research-scale plots typically less than about 100 square feet.

Six cellulosic biorefineries that are being co-funded by the U.S. Department of Energy also are in the works across the U.S. that should be completed over the next few years. These plants are expected to produce more than 130 million gallons of cellulosic ethanol per year, according to the U.S. Department of Energy.

Source: January 7, 2008 IANR News and Photography news release, UNL Institute of Agriculture and Natural Resources.

Organic Matter — Should It Matter? A Golf Course Perspective (continued from page 1)

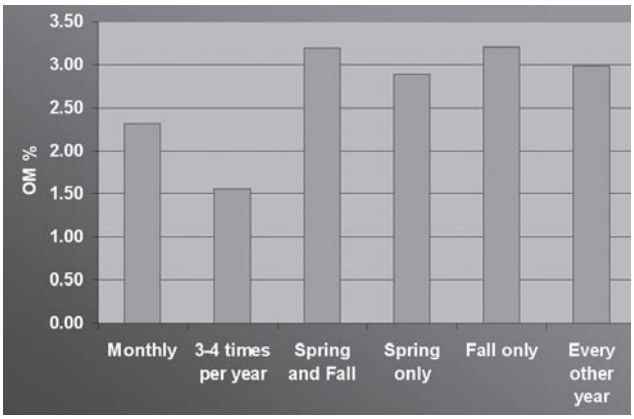


Figure 2. Organic matter content relative to cultivation frequency.

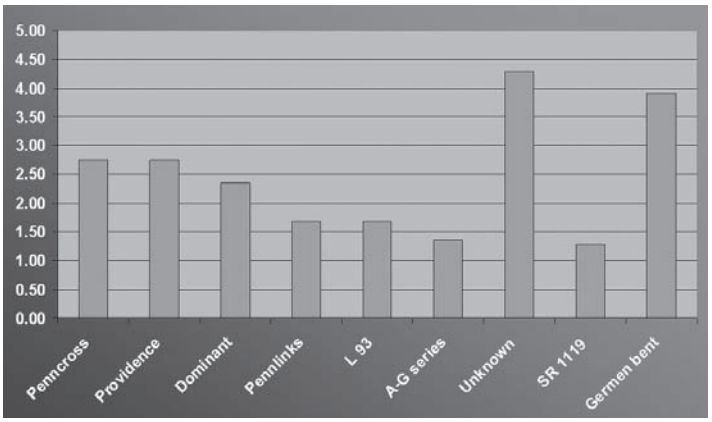


Figure 3. Organic matter content of bentgrass cultivars (greens height) sampled in 2006.

managing OM accumulation. The LIC treatments will include Toro HydroJect, PlanetAir Bayonet tine (4.75"), and ¼ inch solid tine (needle tine). All LIC treatments will be used in combination with conventional ½ inch coring tines or conventional ½ inch solid tines. Work will be conducted on research greens located near Lincoln, NE that are 11 and 8 years old and built to USGA specifications. All treatments will receive the same annual quantity of topdressing regardless of cultivation treatment. This will require changes in frequency depending on cultivation treatment parameters. In addition to OM content, data will be collected on infiltration, surface hardness and other important agronomic features. This work has just begun, so there are no data to share at this time.

We sincerely appreciate the generous support of the three superintendents associations partnering with the University of Nebraska Turfgrass Science Team. We look forward to sharing more definitive results in the near future.

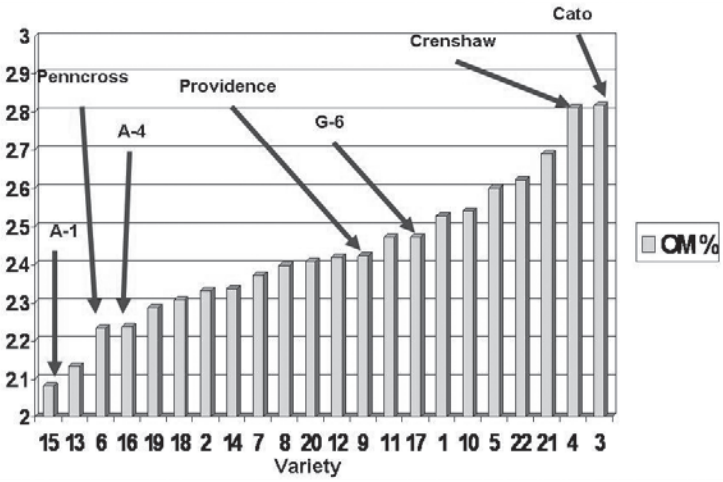


Figure 4. Variation of Organic Matter (%) in 22 Creeping Bentgrass Cultivars. Samples taken from North Shore CC, IL. LSD value = 0.28.

Using the Corn Stalk Grazing Calculator as a Decision Aid

by Aaron Stalker, Department of Animal Science and Matt Stockton, Department of Agricultural Economics,
West Central Research and Extension Center, UNL, North Platte

Because of the abundance of corn fields in Nebraska, grazing corn stalk residue represents an opportunity to reduce winter feed cost. Corn residue is a relatively high quality feedstuff and is comprised of several components. Residual corn grain is the highest quality component followed by husk, leaf, stem and cob in descending order of quality and palatability. For this reason cattle preferentially seek out the grain, then husks, and finally the leaves. The stalks and cobs are of poor quality and palatability, and are therefore rarely consumed by cattle when the grazing of corn fields is properly managed. Early in the grazing of a corn field, the quality of the diet is quite high, but because cattle preferentially select the highest quality components, quality of the diet declines over time. Figure 1 illustrates this concept. Stocking rate influences the amount of grain and husk available per animal, and therefore influences the rate at which diet quality declines. Quantity of residue and stocking rate are critical management factors if grazing of corn reside is to be accomplished successfully. An article in the 2004 *Nebraska Beef Report* titled "A Review of Corn Stalk Grazing on Animal Performance and Crop Yield" summarizes research conducted at the University of Nebraska that established these concepts.

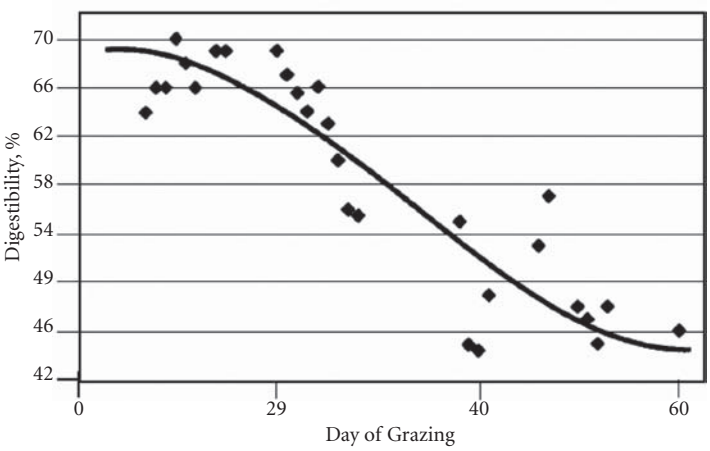


Figure 1. Change in quality of the roughage fraction of diets selected by calves grazing corn stalks (2004 Nebraska Beef Report Pp. 13-15).

Allowing the cow to harvest the residue costs less than feeding harvested forage, and corn stalks are often the least expensive source of feed in the winter. The two most common ways to price corn stalks used for grazing is on a per-animal per-day and per-acre basis. Rates vary considerably due to variations in lease terms and amount of reside available for grazing. In some cases the fences are built and maintained by the land owner, while in other cases the cattle owner provides the fence. The same is true of watering equipment. Other negotiable items include who monitors the cattle, who makes minerals and supplements available, and who provides hay and feeding when winter conditions prevent grazing.

Perhaps the most important factor to consider by both land owner and cattle owner when negotiating the lease of corn residue

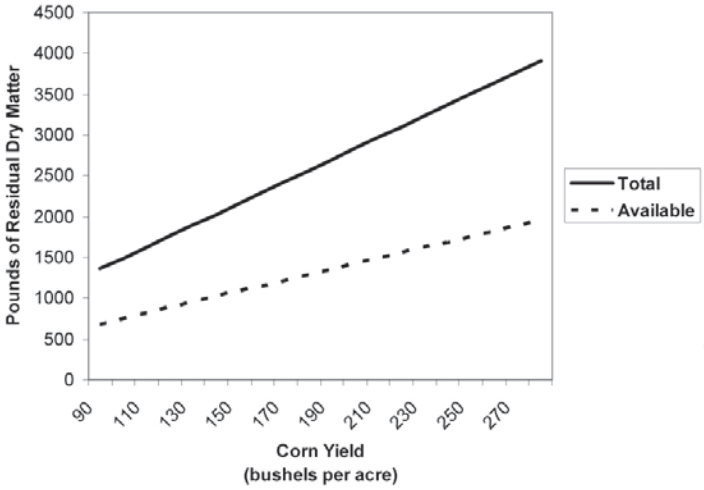


Figure 2. Corn Yield and Residual Dry Matter

is the amount of residue available on a particular plot of ground. The amount of leaf and husk produced in a corn field is directly proportional to the corn grain yield. Research conducted at the University of Nebraska established the mathematical relationship between corn yield and residue production (2004 *Nebraska Beef Report*). Figure 2 shows this relationship. This function provides the basis for determining forage yield, which can then be directly linked to lease value. When this information is combined with the concept of the animal unit month (AUM), the carrying capacity of any field with known yields and size can be estimated. Like all grazing situations, not all of the available forage will be consumed by the animal. The harvest efficiency can be influenced by management factors such as strip grazing, but because the residue is so inexpensive, costs associated with more intensive grazing management may exceed the returns.

This information has been available for some time, but until now it has not been combined in an easy-to-use format that can be easily accessed by producers. An Excel spreadsheet called "Corn Stalk Grazing Calculator" has been designed by researchers at the UNL West Central Research and Extension Center. The corn stalk grazing calculator will estimate the carrying capacity of a field of corn stalks given a specified yield, animal size, number and grazing period. It also includes economic evaluation that incorporates the cost to transport livestock to the corn field and check their care and condition, which may be more costly than the corn stalk rent.

This spreadsheet can be accessed at www.agmanagerstools.com or westcentral.unl.edu/agecon. If you wish to use this program, it is necessary that your computer is capable of reading and using Microsoft Excel files. It is also critical that the acres available match the acres needed.

One way to use this tool would be to determine if the corn stalk acres leased are adequate to support the number and size of cattle for the planned grazing season. If not, either the number

of cattle or length of the grazing season would need to be altered. These inputs can be varied quite easily in the calculator until the acres required match the acres available.

Another possible use is to assist cattle owners to evaluate the feasibility of grazing their cattle on corn stalks that are various distances from their headquarters. While corn stalks may appear to be economical to lease, the transportation cost and the cost to supervise and care for the cattle need to be considered carefully, since they may dramatically increase the cost of utilizing the crop residue.

For example, the corn stalk grazing calculator indicated that 130 acres of corn stalks would support 70 animals weighing 1,000 pounds for 112 days if the corn yielded 200 bushels per acre. If the grazing lease were $10 per acre, the cost for the stalks would be $1,300. If the cattle had to be hauled 75 miles at a cost of $5 per load per loaded mile, and there were 35 animals per load, the cost to haul the cattle to the corn stalks and back would be $1,500, $200 more than the grazing lease. If the distance traveled to check the cattle were 60 miles one way, it would add an additional $420 to the total costs if the cattle were checked five times using $0.45 cents per mile vehicle cost and $30 per trip for labor. The cost to lease the corn stalks would be $0.17 per head per day. The cost including the lease, cattle transportation, and supervisory checks would be an additional $0.24 per head per day, making the actual total cost $0.41 per head per day. In this instance, every 10 miles of decreased distance in cattle transport and checking resulted in a reduction of about $0.03 per head per day.

While the above example shows the importance of including cattle transportation and monitoring costs, the information provided is limited to the specific situation. The corn stalk grazing calculator was designed to be flexible, allowing for users to customize it to their situations.

The goal of this tool is to permit farmers and ranchers to quickly evaluate their unique circumstances and obtain information critical to making good business decisions – making Nebraska, families, farms, ranches and communities stronger.

Jim Fenton

Avian Response to Invasive Tree Removal on Remnant Prairie Pastures in Southeast Nebraska

Elizabeth Forbus and Craig Allen, School of Natural Resources, UNL

The Landowner Incentive Program utilizes federal dollars administered through the Nebraska Game and Parks Commission to aid landowners in the restoration of their properties. In southeast Nebraska this program targets the removal of invasive tree species encroaching on privately-owned remnant prairies, usually managed as pasture for cattle. The spread of woody species into grasslands is detrimental to obligate grassland plant and animal species, and also decreases forage production for cattle grazing on these pastures. Only about 1% of pre-settlement tallgrass prairie habitat remains in North America, and these are often degraded. The Landowner Incentive Program is one step toward restoring tallgrass prairies.

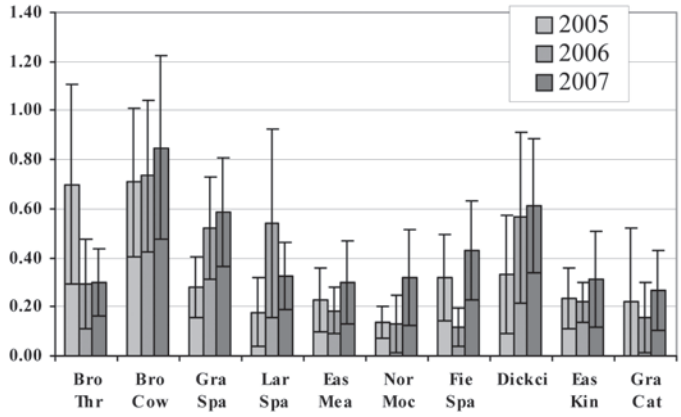
Our research focused on measuring the success of the Landowner Incentive Program's goals in southeast Nebraska. The response of flora and fauna to tree removal has not been studied and is poorly understood, prompting the need for measuring and monitoring the response of vegetation and wildlife to the tree removal treatments.

Paralleling the decline in grassland habitat, grassland birds have precipitously declined. Data compiled from the North American Breeding Bird Survey (BBS) since the mid-1960s indicates that few species of grassland birds are increasing, and that three out of four grassland bird species experienced declines between 1966-1993. More than half of those declining species had cumulative population losses exceeding 50%.

Vegetation composition surveys using nested one-meter plots and surveys to measure vegetation structure were completed in June of 2005 (pre-treatment) and 2007 (two years post-treatment). The Floristic Quality Index was used to analyze vegetation data and rank habitat quality at each of the sites, a method that has been used extensively in many states. Higher FQI values indicate higher quality native prairie. Mean FQI increased at four of the 11 sites following treatment and stayed the same at one site; there was no overall treatment effect – over the relatively short duration of our experiments Floristic Quality and vegetation structure were not measurably different prior to or after tree removal treatments.

We used distance sampling to determine densities of grassland birds on 11 pastures in southeast Nebraska from 2005 to 2007. These pastures were all invaded to some degree by invasive species of trees, mainly eastern redcedar (*Juniperus virginiana*), Osage orange (*Maclura pomifera*), and honey locust (*Gledistia*

Piles of dead trees remaining on a research site one year after tree clearing.



Changes in the densities of 10 bird species before (2005) and after (2006 and 2007) treatments to remove invasive trees from remnant prairies in southeast Nebraska.

triancanthos). Bird surveys were conducted in spring and summer of 2005, trees were removed in fall and winter of 2005, and surveys were repeated post-treatment during the two following breeding seasons (2006 and 2007). Ten species of birds (seven grassland and three non-grassland) were investigated to measure changes in their population density following tree removals. Multi-model inference was used to select best-fit models to explain bird density, based on variables such as plot size, surrounding land use, pre-treatment tree density, and vegetation quality and structure.

Prior to and after the removal of invasive trees, we built models that investigated the relationship of bird density to tree density, Floristic Quality, tree density and Floristic Quality in combination, vegetation structure, non-native vegetation, landscape grassland habitat at 400 meters and 800 meters surrounding our study sites, and habitat patch sizes.

Densities of all seven grassland bird species increased to some extent following tree removal, as did two of the three non-grassland species. Overall, trends showed an increase in both grassland and non-grassland species abundance following treatment. Model results suggested that the density of trees was the most important variable affecting bird density for most species prior to tree removal in 2005. After trees were removed, the frequency of non-native plant species most influenced the density of birds, although some variables, such as plot size, were also important for some species.

Different species react in very different ways to habitat change. For example, dickcissels and eastern meadowlarks are both grassland species, but they don't have identical habitat needs and preferences, so they may react differently to treatments and habitat changes. Upland sandpipers are an obligate grassland species, but they often prefer burned grassland habitat, while eastern meadowlarks and grasshopper sparrows prefer ungrazed and unburned pastures. Dickcissels prefer a more dense litter cover than eastern meadowlarks, although eastern meadowlarks prefer a small amount of litter present, so overgrazed pastures may be marginally suitable for either species. Therefore, it is important to also take into account that tree density is not the only variable that has an effect on grassland bird presence and success, and the removal of trees alone will not provide ideal habitat for all grassland bird species, although the presence of trees does decrease the density of grassland birds.

Editor's Note: Forbus is a graduate student and Allen heads the Nebraska Cooperative Fish & Wildlife Research Unit.

Conserving Wildlife and A Way of Life: Conservancy Launches Grass Exchange Program

Grass, or forage, is the gasoline that fuels the economic engine of ranching in Central Nebraska. For ecological reasons, sometimes that engine needs a rest.

Ranchers who want to improve the ecological condition of their land through rest or prescribed fire are often hindered by the lack of alternate forage. To address this problem, The Nature Conservancy is launching a new grass exchange program.

Thanks in part to a Nebraska Environmental Trust Fund grant, the Conservancy is working with partners to offer landowners high-value forage in exchange for resting overgrazed pastures along the Central Platte River. These private-lands grazing deferments will give farmers flexibility in their grassland management decisions and will help them maintain the economic viability of their operations while enhancing the grassland diversity that provides habitat for native birds and wildlife.

Tim Tunnell, the Conservancy's Grassland Manager, explains, "Over the past five years, we have worked with more than 50 individual landowners through the Platte River Habitat Partnership. Grazing deferment is often not an option for these landowners due to the lack of available pasture for rent, or because of inadequate infrastructure to facilitate grazing. We hope to work with public and private entities within the Platte Valley to address infrastructure needs like fencing and water on properties that are currently not grazed but could benefit from managed grazing. In turn, participants could graze these areas in exchange for rest and follow-up management on their properties."

Editor's Note: Reprinted with permission from the Fall 2007 issue of the newsletter published by The Nature Conservancy in Nebraska.

Resources

Three relatively new (2006-2007) publications from the Soil and Water Conservation Society (SWCS) may be of interest to our readers. Purchase from SWCS web site, store.swcs.org.

Environmental Benefits of Conservation on Cropland – the Status of Our Knowledge. In conjunction with the USDA's Conservation Effects Assessment Project (CEAP), the Soil and Water Conservation Society has published a synthesis of the current scientific literature on what is known and not known about the field-level effects of conservation practices applied to cropland. The 326-page report published this year addresses conservation practices for soil management, water management on rain-fed and irrigated cropland, nutrient management, pesticide mitigation, integrated pest management, and landscape management.

Managing Agricultural Landscapes for Environmental Quality. Book brings together the expertise of individuals in the scientific community to quantify the environmental benefits of conservation practices at landscape and watershed scales. A special section presents the needs and perspectives of a wide range of practitioners and policy makers responsible for projects designed to improve soil, water, air, and habitats.

Environmental Management Glossary. Reference handbook includes over 4,000 terms from 50 disciplines and increases understanding of our interconnected world.

A new full-color digital map showing Nebraska's land use (using data from 2005 growing season) is available from UNL's Center for Advanced Land Management Information Technologies (CALMIT). The map depicts 25 land use classes and crops are identified as either irrigated or dry land. All maps produced and a final report from the 2005 Land Use Mapping project can be accessed at www.calmit.unl.edu/2005landuse/.

Eastern gamagrass (Tripsacum dactyloides): A plant for forage, conservation, and bioenergy. This 2007 45-page technical report from USDA-NRCS covers the description, uses, establishment, management, and more about this highly useful warm-season grass. Download it at npdc.usda.gov/publications/index.html.

The Center for Integrated Agricultural Systems at the University of Wisconsin-Madison has many online publications related to grazing (primarily in connection with dairy production), including a quarterly newsletter titled "Grass Clippings." See www.cias.wisc.edu/archives/cat_livestock_and_pasture.php.

To obtain information on USDA standards regarding marketing beef as "grass (forage) fed" or "naturally raised," see www.ams.usda.gov/lsg/stand/claim.htm.

CGS Associates

At the National Association of State Universities and Land-Grant Colleges (NASULGC) annual meeting in November in New York City, **Fred Baxendale** was presented the 2007 North Central Regional Excellence in Extension Award. The award recognizes a select group of Cooperative Extension System professionals who excel at extension programming, make a positive impact on constituents served, and provide visionary leadership for the system.

At the Honor Society of Agriculture Gamma Sigma Delta initiation and awards banquet in October 2007, **Darrell Mark** received the Excellence in Teaching Award, and **Don Adams** received the Nebraska Chapter Distinguished Service to Agriculture Award of Merit.

Richard Sutton received two awards in November 2007: Tree Planters State Award from the Nebraska Statewide Arboretum, which recognizes administrative leadership in tree planting and landscape enhancement efforts in Nebraska; Honor Award in the Research category from the Great Plains Chapter of the American Society of Landscape Architects at Homestead National Monument of America.

Kristin Miller, NRCS District Conservationist in Sidney, received the 2007 Range Management Service Award at the annual meeting of the Nebraska Society for Range Management in October.

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