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North Central Research and Outreach Center

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NEW BEGINNINGS

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One of the things about change is it often means the end of one thing and the start of something new. At the North Central Research and Outreach Center (NCROC), we are seeing that in small and BIG ways!

First, let me say that this will be our last newsletter to you. Budgets, societal change, and technology all have combined to move the paper newsletter off of the desks of editors into the "dustbin of history." This is true in the private and public sectors alike. Printing and postal costs stress our already declining budgets. As consumers, we are all increasingly receiving our news in other ways, in many cases driven by the always-advancing technology of the computer and internet. In fact, we are the last University research and outreach center (ROC) still publishing a paper newsletter, but no more. You should always know that we value the relationship we have with you and we are not turning our backs to a responsibility of keeping you informed and connected. We now plan to redirect our efforts in letting you know about our work in other ways!

As a beginning to our reinvestment in that connection, we will begin work in June in redesigning our website. We plan to have many more resources available to you on the web for you to access and see our work, as well as the work of the broader ROC system and University. Our target is to be up-and-running with a "new look" by early fall. Watch for news about that!

Even bigger, more significant news is expected about the time you will be reading this newsletter. A vote is expected by the University of Minnesota Board of Regents on June 10th that will alter the U's landscape considerably. Most directly affecting us, if approved, will be the integration of the College of Natural Resources (CNR) with the academic units of the current College of Agriculture, Food and Environmental Sciences (COAFES) to create a new, expanded college that "focuses broadly on food systems, environmental science, policy and renewable resources." With the Board's consent at their June meeting, CNR will cease to exist by July 1, 2006 as implementation of the change progresses over a year's time.

As an alumnus of CNR, I grieve the loss of a college that has so much to be proud of in its 100-year (plus) legacy of quality graduates and research in Minnesota and beyond. But, financial and other pressures on the University to adapt to change have been tremendous and CNR, along with the College of Human Ecology, General College and others are all part of a restructuring that President Bruininks is asking the Board to accept. Those long-standing contributions will continue, but from within a new college with a new (to be determined) name. In his recommendations, President Bruininks has asked for these changes not to just keep the University of Minnesota vital, but becomes even more so as it strives to become "one of the top three public research institutions in the world within a decade."

While the biggest changes may seem to be in the Twin Cities, the ROC's will be

affected as well. But we are ready. NCROC, probably more than any other ROC, has had faculty located here from both colleges for many years. So when President Bruininks says in his recommendations that now will be the time to "improve the management and ongoing renewal of the University's critical regional sites" (e.g., NCROC), we welcome the opportunities ahead for our ROC to be a key player in that renewal!

In closing, it must be noted that more than a year has been spent by many, many people in getting us to this milestone event. There is so much background and more to be said than this space allows, so I hope that you take the time to view President Bruininks' website to learn more about the Strategic Positioning Initiative. It can be located at: www1.umn.edu/systemwide/strategic_positioning.



AGRICULTURAL ENGINEERING

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Like at other similar organizations, adequate basic support in such categories as land, water, facilities, and equipment is vital to the successful conduct of research at NCROC. This is a brief story of recent efforts to try to ensure continued availability of irrigation water for our horticulture and forestry research programs.

The story begins with the massive crude oil spill on NCROC land from a pipeline that ruptured in March of 1991. Some of the spilled oil entered a large drain line and traveled to the Prairie River, entering at a

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

point near the Hwy 169 bridge. For years prior to the spill, the river had served as our source of irrigation water for horticulture plots near the river. In fact, we had even constructed a pump pad next to the river and a driveway down the steep bank for safe access to the pad. This pad was also located near the bridge and immediately adjacent to the point where the oil entered the river. Because of the risk of oil contaminated irrigation water and other factors, the oil pipeline company paid for a large capacity irrigation well (over 400 gpm) that was drilled near the horticulture plot areas. Since then, this well has been used every growing season to irrigate not only horticulture plots but also forestry plots that have expanded in areas near the well. In the later '90s, the old pump pad by the river was destroyed in the Hwy 169 expansion project. Also, several years ago, the DNR instituted a program to suspend surface water irrigation permits during periods of low stream flow, i.e. when our needs for irrigation water would likely be the greatest! As a result, this well has become practically indispensable for much of both our horticulture and forestry research programs.

The well is equipped with a 30 hp, 480 volt, 3-phase, submersible pump. Unfortunately, in 1991, 3-phase power was not available from our utility provider. Instead, single-phase power was supplied and an electronic phase converter (PC) was installed to furnish 3-phase power to the pump. Incorporated into this unit is a voltage amplifier and variable frequency drive (VFD) that provides for soft/ramp start and manual frequency control to match pump output and pressure to irrigation systems of different sizes and flow requirements from 50 to 400 gpm. Unfortunately, the manufacturer of the PC/VFD unit went out of business in the later '90s and no parts have been available since, during which we have been living on "borrowed time".

Also, in the later '90s, 3-phase power was installed by the utility provider passing about 400 feet from the well. In 1999, this writer obtained an estimate totaling about

\$15,000 for bringing in 3-phase power to the well and replacing the VFD. Funding was finally approved for this purpose earlier this year. Soon thereafter, work began with the electric utility and a local electrician and electronic motor controls specialist to investigate options and costs and to finalize a plan to replace the obsolete PC/VFD drive. In this process, we have been surprised to learn that recent advances in motor controls equipment now make it unnecessary to bring in 3-phase power. Resulting savings in '05 dollars are estimated to be as much as \$10,000! Instead, the existing, standard-type transformer will be replaced with one designed for 240/480 volt, single-phase output to supply a new PC/VFD. Our total cost for the project (equipment and installation) will be about \$10,000. Equipment will arrive after mid June. We will then need to coordinate with both the utility and the contractor to complete the changeover as quickly as possible, while accommodating our needs for irrigation (obsolete equipment still works!).

The above is only one example of the many interesting and oftentimes unique problems that we continually encounter at this center while trying to maintain and improve our research support capability. We hope the chosen solution to this problem proves satisfactory for many years to come.



AGRONOMY

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Many of us will be establishing forages this spring. A question that often comes up after seedling emergence is: was the seeding successful? Often times soil moisture or seedbed condition are not optimum, so we are in the position of evaluating if there are enough of the seeded species present to produce maximum forage yield. Visual estimates may be unreliable, depending on the experience of the observer in estimating

stands. The frequency grid is a simple tool for measuring forage establishment success developed by Kenneth Vogel and Robert Masters, two USDA-ARS scientists in Nebraska. The grid itself is a metal frame containing 25 squares (5 x 5). Each square is 6 inches by 6 inches, and is readily made from a concrete reinforcing sheet. When used, the frequency grid is placed randomly within the seeded area and the number of cells containing one or more seeded plants are counted. The grid is then flipped, end over end, and the counts are repeated. This process continues until a total of 100 cells have been counted per sampling location within the seeding area. Several sampling locations from a field would give the most accurate description of seeding success. Plant counts can be directly converted into stand percentage by dividing the number of cells that contain a seeded plant by 100. For example, if during the required four plant counts at a location, the number of cells with the seeded species was 18, 21, 23 and 17, for a total of 79, the stand percentage at that location would be 79/100, or 79%. In addition to evaluating seeding success of monocultures, the frequency grid can also be used to evaluate stand percentage of individual species within a mixture by counting individual species separately, or stand percentage of a mixture of species by counting the number of cells that contained any of the species in the mixture. A conservative estimate of stand density, or plants per unit area, can also be measured using the frequency grid by counting the total number of plants in four adjacent cells (equal to one square foot).



ANIMAL SCIENCE

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The 2005 spring calving season was a success again. This year our spring cows gave birth to more than 150 calves. The spring was ideal for calving and we encountered few major difficulties. The

cows and calves all appear to be healthy, with the exception of the odd ailment, which we have treated. The early spring also allowed us to turn our cattle out onto pastures earlier than previous years; however, wet cold weather does seem to have limited the pasture growth. Since going out to pasture, the calves have flourished and we are excited to see our future cows and bulls develop.

As mentioned in the November newsletter, we were extremely sad (and a little apprehensive) to see Dan Brown leave us. I especially was concerned with our ability to replace Dan, but the timing was great and we talked Dr. Bethany Lovaas into joining our crew. Bethany is a veterinarian who graduated from Purdue University whose primary interests are related to beef cattle (although she will venture onto the odd dairy farm). Bethany started with us in December and has certainly taken over most of Dan's responsibilities with enthusiasm and shows tremendous ability to coordinate all of our cattle management, research, and Biotech Center operations. Feel free to contact Bethany for any potential beef cattle veterinary needs you may have!!



Dr. Bethany J. Lovaas

In addition to Bethany, we have an animal science team that has adjusted well to the changes and as their responsibilities change their inputs and flexibility has been invaluable to the future success of the team. The regular animal and farm crew that works with the cattle and forages are Kristy Balder, Terry Hansen, Jim Schmitt, and Ray Steffen. In addition, we have two

interns that have fit in well with the crew; Eduardo Carotti is a student from Argentina who will graduate from veterinary school next March and Scott Bird from Deer River, who is studying at the College of the Ozarks in Missouri and will graduate next year. This is a great team and they allow us to collect the data and provide the information to cattlemen from our research projects. We could not be this successful without these folks. Our graduate students, Jamie Larson, Kevin Thielen, Nicolas DiLorenzo, and Carl Dahlen also provide valuable assistance when needed and their research projects are progressing steadily.

Numerous experiments are ongoing and we continue to publish data related to reproductive management of beef operations. This year we have two large multi-states, multi-location studies that will be completed this year. One study revolves around synchronization of estrus in bull breeding herds, with the goal to shorten the calving season and the second study focuses on resynchronizing estrus in nonpregnant cows after the first artificial insemination. Please keep an eye on the Cow/Calf Day report for these results. Research from the completed estrus synchronization studies that are published and used throughout the country can also be seen in the 2005 Cow/Calf Day Report.

From a travel standpoint, I was fortunate to have visited New Zealand and South Africa during the last 12 months. The New Zealand trip primarily was a vacation, but I managed to visit three of my veterinarian friends that live on the South Island to obtain an overview of the livestock industry. It was great to see how supportive the New Zealand government was towards the livestock industry. My South Africa trip was partially funded for Dr. John Arthington from the University of Florida and myself to collect data associated with management and nutritional status of cowherds in four separate areas of the world. The ultimate goal is to summarize our findings in the form of a manual to demonstrate differences among cattle operations worldwide.

The Reproduction Biotech Center is our Center that provides commercial services related to embryo transfer, estrus synchronization, reproductive ultrasound and in vitro fertilization. In addition, we do offer further veterinary services to cattlemen within a short distance of Grand Rapids on a call basis. Please feel free to contact Dr. Bethany Lovaas for any needs you may have.



Finally, our bulls have sold extremely well this year. We do have a limited number of bulls remaining for sale ranging in price from \$1,600 to \$2,000. After a very successful "1st Annual Production Sale" last year, we will have a sale again this year. Please pencil in October 29, 2005 for the 2nd Annual NCROC Production Sale. This year we will be inviting people who sold cattle last year to also participate in the sale this year. Please also plan on attending Beef/Forage Day on August 25, 2005. From everyone on the Animal Science crew at NCROC, we wish you a productive summer and hope to see you at one of our field days or at our sale. Visitors are welcome any time.



FOREST MANAGEMENT

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Minnesota has more state-managed forestlands than any other state except Alaska. Clearly, Minnesota's public forestlands are vital to the economy of northern Minnesota. Future research in forest management at NCROC will explore methods for better integrating forest management plans across public

ownerships. Leaders and staff of the Minnesota Forest Resource Council (MFRC) expect real benefits from better coordinating forest management across ownerships. Many environmental values from the forest require a landscape perspective of forest management. The MFRC has developed landscape-planning committees for all six of the major forest ecological landscapes in Minnesota. Our recent spatial modeling work fits well with key forest values identified by these committees. Better understanding tradeoffs between ecological values and economic objectives of forest management will help decision-makers identify reasonable goals describing desired future conditions for Minnesota's forests. Large-scale landscape analyses help identify opportunities for better coordinating management across ownerships. The costs of achieving desirable future conditions will be less with good collaborative planning and analysis.

In 2004, the State of Minnesota moved the Interagency Information Center (IIC) to the University of Minnesota. NCROC is exploring opportunities for a significant portion of the IIC work to be tied directly with NCROC forestry programs. The MFRC is also considering opportunities to move one of its key forest planning positions to NCROC. Potentially these opportunities may come together to help make NCROC a nationally recognized center for forest planning and policy analysis. Please stay tuned through our website.



HORTICULTURE
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Spring in northern Minnesota can be interesting can't it? Temperatures were above average and plant development, until April 21st, was up to seven days ahead of average. Our strawberry plots had been uncovered and were starting to grow nicely. On April 22nd, we covered

them back up when temperatures of 18 degrees were forecast. They remained covered through April 29th. In the meantime, we are preparing for a busy season of work.

The last two weeks we have been preparing our high tunnels for planting. In 2005 we are taking the information we learned the last two years and applying it to tomatoes. We will use the best spacing, planting date, and pruning system treatment on the best determinate and indeterminate cultivars and compare them with double line or single line trickle irrigation and black or red plastic row cover. During the 2004 growing season we had some indication that double line trickle irrigation gave about 10% greater yield, probably due to better water distribution. Work at Penn State University has indicated that red plastic has resulted in greater tomato production than black plastic in high tunnels. Results from our 2005 study should verify these things and further refine our best management practices for high tunnel tomato production. Incidentally, the High Tunnel Production Manual for Minnesota was completed last winter. It has several contributors and is a valuable resource for commercial as well as home gardeners interested in high tunnel production and extending the growing season in Minnesota. It is available from our office for \$25.

We are expecting a big fruit evaluation season this summer, as the winter provided deep snow and helped the strawberries and blueberries plots survive. A new replicated strawberry variety trial will be planted and will include two new New York variety releases, Itasca-the newest University of Minnesota variety, and new breeding lines from Nova Scotia and the University of Minnesota. Blueberry fruit bud potential looks good at this writing, so evaluation of breeding lines should be excellent this season. Despite some moderately cold winter temperatures, the varieties in our apple orchard appear to have come through well. There should be good production in the 2001 orchard. The newer 2004 planting has a lot of flower

buds, but we will remove those this year to encourage tree development for the future progress of that orchard.

Research with Dr. Stan Hokanson and his group to evaluate woody ornamentals for Zone 3 hardiness and adaptability is continuing along with evaluations with the USDA Plant Introduction Station. Seedling populations of two Zone 5 species (Liquidambar-sweet gum and Taxodium) will be planted, over-wintered and selections of hardy survivors will be collected in 2006. Data on red and sugar maples will be collected as well as survival of smoke bush and rose selections. The annual flower variety trials will be as good as ever as the bedding plants industry has many new items again this year. Currently our greenhouse is full of new and exciting flower varieties that you can see in our hanging basket, shade and sun plots. You are always welcome to visit these plots and identify those types and varieties you like best for your gardens.

I hope you will plan at least one visit to our horticulture plots this season. You are always welcome! Wednesday, August 31 is our annual Horticulture Visitor's Day. If you would like to volunteer your time or provide a tax-deductible financial gift, I would like to hear from you. I hope to see you in the plots this season!



SILVICULTURE & FOREST HEALTH
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The following is a brief description of my summer project plans.

- Teach the Field Silviculture Field course during the Advance Cloquet Session.
- Work with USDA Forest Service personnel and staff at the Grand Portage National Monument to determine the risk of white spruce to the spruce beetle infestation and the possible impact of the

spruce engraver on white spruce.

- Duplicate a study of the Douglas-fir beetle experiment, installed in northern Minnesota last year by Dr. Kevin Dodds and myself, in western Montana. In mid-April, Dr. Steve Seybold of the USDA Forest Service and I placed Douglas-fir and tamarack in the Bitterroot National Forest. We hope to determine if tamarack native to Minnesota is a suitable host for the Douglas-fir beetle.
- Thinning of red pine plantations by Pittack Logging on the NCROC Forest.
- Continued monitoring of white pine regeneration research installations installed by Amy Harder on the NCROC Forest.



TREE IMPROVEMENT
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Quickly, what were you doing in 1983? Where you planting white pine? In 1983 Dick Meier, a forest geneticist with the USDA Forest Service, now retired, was planting white pine on eight sites across the upper peninsula of Michigan, northern Wisconsin and northern Minnesota. These were not just any white pine they were part of a long-term trial to evaluate blister rust resistance in the seedlings of select disease free trees. Although the Forest Service had been screening seedlings from these trees in the greenhouse at the Oconto River Seed Orchard for some time there was a notion that the greenhouse screening did not mimic natural conditions very well. What was called for was a long term trial with multiple families on several different sites.

Lately we have finished measuring height, diameter and blister rust incidence on the trees at the four remaining sites where good data could be taken. A preliminary analysis of all four sites combined indicated that of the 29 families in the trial there were seven that had lower levels of rust incidence than the others. Of these seven

families two had been identified earlier in greenhouse screening as having elevated levels of rust resistance but the other five families were new. Because we have not yet analyzed any older data on these seedlings related to the incidence of rust and mortality we cannot identify seedlings that died from rust and are now gone. However, six of these seven families were in the top seven families for survival. This suggests that these families do have a higher level of resistance to blister rust because more of their seedlings have survived.

The important thing to remember is that none of these families is completely resistant to white pine blister rust. Yet, a substantial number of them do show evidence of increased levels of resistance. We will be targeting these trees as part of our breeding program to produce the most rust resistant seedlings possible for white pine regeneration programs throughout Minnesota. In time you will see these seedlings on industry and public lands and they will be for sale through commercial nurseries but right now they are still in the breeding stage. (Special thanks to Kathy Haiby, Carrie Pike and James Warren for measurements, Carrie Pike for the initial analysis and of course Dick Meier for establishing the trial.)

NEWS FROM NORTH CENTRAL

Employee News

Two significant job anniversaries occurred during the first quarter of 2005. Both Tim O'Brien (Research Plot Coordinator, Forestry) and Tom Carey (Carpenter, Maintenance) reach 25 years of dedicated service to the North Central Research and Outreach Center and the University of Minnesota.



Mr. Thomas A. Carey (left) receiving his 25 year award from Dr. Daniel L. Erkkila (right).



Mr. Timothy C. O'Brien (left) receiving his 25 year award from Dr. Daniel L. Erkkila (right).

Legislative Bonding News

On April 11, Governor Tim Pawlenty signed a \$945 million bonding bill for the state of Minnesota, including more than \$111 million for the University of Minnesota for construction and renovation projects on its various campuses. The University's capital (bonding) request was originally submitted to the Minnesota Legislature for the 2004 legislative session, but when an agreement could not be reached on a state bonding bill last year, the U resubmitted its request this session for \$158 million in state contributions. NCROC was one of only a few outstate locations to receive funding to replace the farm maintenance facility, originally constructed in 1915. This building serves nine research projects for maintenance and carpentry services, including upkeep of vehicles, farm tractors and numerous farm and specialized research equipment. Our thanks are extended to Representative Loren Solberg and Senator Tom Saxhaug for their support in this project.

NEWS FROM THE EXTENSION REGIONAL CENTER AT GRAND RAPIDS

The Extension Regional Center, Grand Rapids staff along with local Extension staff in counties work together to provide outreach education through the University of Minnesota Extension Service. The outreach mission is accomplished by "connecting community needs with University resources to address critical issues in Minnesota", though state,