

UNIVERSITY OF MINNESOTA
North Central Research & Outreach Center



NORTH CENTRAL NEWS

GRAND RAPIDS, MINNESOTA

MAY 2001

VOLUME 3, NUMBER 1

UNIVERSITY OF MINNESOTA
DOCUMENTS

MAY 27 2001

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Natural Area Development Continues

In July 1996 as part of our Centennial Celebration, the North Central Research and Outreach Center dedicated a 15 acre tract of land as a "natural area". The natural area contains three primary ecosystems. A nine acre bog is surrounded by six acres of "old growth type" timber. The north edge of the bog includes a transition zone between the bog and the upland where water flows from the bog. The area contains dense alders and is sometimes called a lagg.

The bog area contains a forest dominated by black spruce, a typical swamp or bog conifer. Within the bog are a variety of herbaceous bog type plants including pink lady slipper and pitcher plants. Numerous woody swamp type shrubs such as leather leaf and laborador tea can be found in the bog.

The upland old growth type forest area has many of the characteristics of a typical northern Minnesota older forest type. The largest trees are 150-175+ year old red and white pine. Natural succession has produced a more mixed species understory type dominated by balsam fir within the mixed red and white pine stand.

This past summer, Janet Larsen, an ecologist and expert on plant identification, spent several weeks identifying the plant species present in the bog and upland areas adjacent

to the access trails. Janet was able to identify, photograph and tag over sixty plant species/



types within the natural area. We are in the process of putting plant identification signage near each plant species so that visitors to the natural area can identify the plants in the area.

Amy Johnson from our NCROC staff is developing a book with photos, and information about each plant in the natural area and a trail guide to help visitors locate the various plant species.

This past fall, Tom Carey (NCROC Carpenter) and Tim O'Brien (NCROC Forestry Plot Coordinator) worked together with their crews to improve access to the plant communities within the bog and to provide seating for students or groups. The bog trail,

a wooden pathway built with two widths of 2x8 treated wood, was extended through the bog and seating for sixty persons was constructed on a hillside where the upland and bog trails intersect. Group access platforms were established at pink lady slipper and pitcher plant sites.

This summer we plan to develop curriculum materials and activities for various age groups of students and provide parking space and bus turnaround space at the entrance to the natural area. Materials describing the natural area and its potential as an environmental classroom will be distributed to area schools.

The natural area and its surrounding forest land is being developed as an environmental education site for students and visitors. The site should provide an understanding of bog and upland ecology and an appreciation for various ecosystems in our environment.

Funds for developing the natural area were provided from an environmental grant from the Department of Natural Resources and the Summer Assistant Scientist Program, a cooperative educational partnership between the College of Agriculture Food and Environment Sciences and the Minnesota Department of Agriculture's Ag in the Classroom program.

This archival publication may not reflect current scientific knowledge or recommendations.
Current information available from University of Minnesota Extension: <http://www.extension.umn.edu>.

News from North Central

Dr. David L. Rabas, Center Head - drabas@umn.edu



As I write, it is past mid April and the last vestiges of winter have yet to disappear. Some of our "snow-bird" friends

Paul and their families.

The legislature is in the process of moving toward some decisions regarding University of Minnesota funding. The numbers I see are not very encouraging. Hopefully the legislature will recognize the return on investment that comes from resources provided to the University and will come closer to meeting the University's needs. If not, we are likely to face some budget reductions in the next fiscal year.

who returned early from warmer climates have had a chance to re-experience winter. The last few weeks have been more like late winter than early spring. If this "spring" is like many others we have experienced, we will move from "late winter" into summer and skip spring. When you receive this newsletter it will probably be hot and dry rather than the cold wet period we are currently in.

Several NCROC staff have passed milestones in their employment at NCROC. Congratulations to Laura Carey and Keith Mann (5 years); Dan Brown (15 years); John Teske (20 years); Henry Schumer (25 years) and Jim Boedicker (30 years).

Spring weather has created a very muddy calving season for many Minnesota beef cow-calf producers. The current weather conditions will also mean that spring field work and other spring activities will be compressed into fewer weeks and create a very busy and hectic schedule for many of our readers.

As I write, calving at NCROC is about three fourths completed. By the time calving is completed over 200 calves will have been born. Dan Brown, Ray Steffen and the rest of the livestock crew deserve a thank you for a job well done under very difficult weather/mud conditions.

The NCROC family grew by three so far this year. Baby boys were born to Andy and Jaci David and Dan and Jenna Boedigheimer and Paul and Paula Anderson had a baby girl. Andy and Paul are faculty members in the Aspen/Larch Genetics Cooperative and Dan is a Junior Scientist with the Wild Rice breeding project. Congratulations to Andy, Dan and



Henry Schumer (below), Wild Rice Research Plot Coordinator (25 years) and Dr. Jim Boedicker (above), Agricultural Engineer (30 years) are recognized for their years of service to the North Central Research and Outreach Center.



Upcoming Events

Wild Rice Research Field Day

Thursday, July 19, 2001

9:00am - Noon

Location: North Central Research and Outreach Center

Horticulture Day

Wednesday, August 29, 2001

2:00pm - 6:00pm

Location: North Central Research and Outreach Center

Beef/Forage Day

Thursday, August 30, 2001

10:00am - Noon

Registration begins at 10:00am

Location: 4 miles south from Grand Rapids on Hwy 169, then 1/4 mile East on the Harris Town Road.

Garden Club Tour

Tuesday, September 4, 2001

6:00pm - 8:00pm

Location: North Central Research and Outreach Center

Advisory Committee Members Needed

The North Central Research and Outreach Center has a citizen Advisory Committee. The committee advises the Center on research and outreach needs, seeks input from our customers and provides advice and support for University of Minnesota legislative requests.

The 15 member committee meets at least once per year. If you are interested in helping our Center maintain contact with our customers, please let us know that you would be interested in serving on our Advisory Committee.



Agronomy

Mr. Russell D. Mathison, Agronomist - mathison@umn.edu

Grazing systems research will expand with the initiation of data collection from two studies seeded in 2000.

The first of these is a fall stock-piling trial in cooperation with Dr. Paul Peterson, a forage specialist with the Minnesota Extension Service in the Department of Agronomy and Plant Genetics, St. Paul. Fall stockpiling is a management tool to help reduce feeding costs, which are the largest single expense for beef cow-calf producers. Fall stockpiling consists of accumulating forage in place for use at a time when pasture plants have gone dormant in the fall. A plentiful supply of nutritious feed in fall would reduce the amount of stored feed needed, improve physiological status and body condition score of pregnant cows, and economically increase weight of

calves. Previous falls stockpiling research at the North Central Research and Outreach Center (NCROC) investigated the use of our traditional cool-season grasses and perennial legumes: orchardgrass, reed canarygrass, smooth brome, timothy, alfalfa and birdsfoot trefoil. The new focus will be on the fall-stockpiling potential of other species used in grazing systems elsewhere. These species are: festolium, which is a crested wheatgrass and tall fescue cross, perennial ryegrass and tall fescue. These species tolerate frequent defoliation, regrow quickly after defoliation and are less fall-dormant than our traditional cool-season grass species, so we expect they will be more productive later into the fall and of higher quality. All have been evaluated at the NCROC for potential as hay species but not under intensive grazing management. Mob grazings with beef cows will occur whenever forage height has reached twelve inches, or every 35 days. Fall management will be to

graze no later than 25 July, apply nitrogen fertilizer at fifty pounds per acre, then graze one block six weeks before frost and compare results to another block grazed six weeks after frost.

A second study will focus on persistence of birdsfoot trefoil. Trefoil lacks long-term persistence. It is thought that plant loss is largely due to disease. Unpublished preliminary research has indicated that addition of nitrogen fertilizer may also help to lengthen trefoil stand life. Because nitrogen fertilizer addition has been observed to extend stand life of trefoil, it may be possible that trefoil is not fixing adequate nitrogen. The research objectives will be to substantiate whether nitrogen addition actually extends trefoil stand life, attempt to quantify the amount and timing of nitrogen application, and compare trefoil stand life between a system using added nitrogen to the conventional system, which uses annual seed set and new seedlings to promote persistence.



Forest Management

Dr. Howard Hoganson, Forester - hogan001@umn.edu

Analyses for the current forest planning effort for Minnesota's National Forests will continue to dominate our time for at least

the next six months. Draft benchmark model runs have recently been completed for both the Superior and Chippewa National Forests. Next steps involve detailed analyses for each of at least seven alternative strategies for each forest. These scenarios will cover a broad spectrum of issues and possible management directions. The intent is not to have a model select a best alternative but to simply use new computers to help better understand trade-off between alternatives. For each forest-wide alternative, models can help identify effective and efficient management strategies. The models applied are perhaps the largest optimization models ever applied to forest management problems in this country. Equivalent linear programming formulations would in-

volve over 10 million variables and 1 million constraints. Data requirements are enormous. For each forest, how much old forest is appropriate will likely be a key issue. Details about the planning process can be found at each forest's web site (www.fs.fed.us/r9/chippewa & www.fs.fed.us/r9/superior). The Forest Service very much encourages public participation by stakeholders. The local Itasca Forest Resources Network is also very interested in the process and welcomes additional members (contact the Itasca Development Corporation www.itasca.org or 326-9411).

With concerns increasing over forest environmental issues, spatial facets of management are also increasing in importance. Spatial facets are difficult to model because of many interdependencies involved. Spatial facets also point to the need to better coordinate management across ownerships. This is a recognized problem nationwide. Plans in the next month are to work jointly with Dr. Thomas Burk of the U of MN Forest Resources Department to develop a detailed research proposal in response to a call for pro-

posals by the US Department of Agriculture (USDA) and The National Aeronautics and Space Administration (NASA) for applications of geospatial and precision technologies to agricultural and natural resource issues. Satellite imagery offers enormous potential to improve and increase forest baseline information. Our modeling approaches seem to have a comparative advantage for recognizing additional spatial detail. Proposed work may compliment nicely potential applied multi-owner forest planning work we are exploring with the Blandin Foundation through the Itasca Sustainable Forest Network. From a national perspective, Itasca County is likely a great pilot study area for collaborative forest planning because a large percentage of the land is forested and in public ownership. It is also split almost equally in area between federal state and county government with ownership areas greatly intertwined. Minnesotans also seem to take pride in how they can work well together. Perhaps major funding through a USDA/NASA grant is a long shot, but the opportunity seems worth pursuing.

Agriculture Engineering

Dr. James J. Boedicker, Agriculture Engineer - jboedick@umn.edu



This is intended to provide an update on two ongoing activities at this Center's Beef and Forage Research Farm south of Grand Rapids.

One is the beef mortality composting project, described in the previous two issues of this publication. The other involves our roll in maintaining a UV (ultraviolet) radiation monitoring station established there in 1996.

The mortality composting project, begun under the sponsorship of the MN Department of Agriculture, is designed to test the effectiveness of a low-cost, single stage composting process for disposing of beef carcasses. It involves simply burying the carcass(es) within an uncovered pile of moist sawdust, the carcass(es) remains preferably undisturbed, in the pile for as long as necessary to achieve essentially complete decomposition.

The first pile was formed in the fall of 1999 with three 400 to 500 lb calf carcasses. Temperatures in the pile reached 140° to 150°F before declining, the pile going "dormant" over the winter. A second, less pronounced heating cycle occurred over the spring and summer of 2000, but by late fall, bones in the pile were still hard. In the spring of 2000, two more piles were formed each containing a mature cow carcass and one or two stillborn calves. These piles also experienced a sharp temperature rise followed by a gradual decline until winter. The approach of winter in 2000 saw an increase in the frequency and extent of animal intrusion into the piles. A multi-strand electric fence around the study area remains a possibility. We will continue to monitor these piles over the coming year. When the decomposition process is considered complete in each pile, it will be sampled for pathogen analysis.

The UV radiation monitoring station is just one in a nationwide network of stations operated by the USDA UV Monitoring Program headquartered in Fort Collins, CO. The program was established in

response to concerns about possible increases in UV radiation, associated with changes in the earth's protective ozone layer, and its effects on food and fiber production in the United States. Information gained could have other applications as well.

The monitoring station is located in an area where it has a good "view" of the sky in all directions. Instrumentation at the site continuously monitors visible and UV radiation (also temperature and relative humidity) and stores the data in a data logger. Every day, the data is automatically transferred by phone to Fort Collins. Under our contract with the USDA, we are responsible for maintaining the electrical and phone services to the site, changing out sensors and other components as required, and other minor maintenance. Any high tech maintenance is done by USDA personnel. One unintended benefit of the monitoring station to our beef research program is that it does provide a convenient power source for an electric fencer required for grazing research and also for a wireless heat detection system that aids the breeding program.

Animal Science

Dr. G. Cliff Lamb, Animal Scientist - clamb@umn.edu



It is tax day and the middle of April and we are experiencing a snowstorm! We also are nearing the end of our 2001 calving season.

I think all cattlemen in the North Central region of the United States have experienced a harsher winter than the previous two or three winters. We were no different! The cold, muddy, wet calving conditions have been tough on the cattle, but the weather has also been an added source of frustration for the calving crew. We have an excellent group of animal attendants who have worked extremely hard to keep their spirits up in the face of miserable weather. Without Dan Brown, Ray Steffen, Terry Hansen, Jim Schmitt (who I apologized to for not mentioning him in the previous newsletter), and Kristi Balder taking such good care of the cattle throughout the winter, calving would have been a disaster!

Our total cow herd numbers have reached the capacity for which we had aimed for when I first arrived three years ago. Of the 206 cows that entered the calving season we should end up with about 190 healthy calves to wean. A poor calving rate can be attributed to a number of factors, such

as poor nutrition, disease, weather, stress etc. In our case we may have a combination of many factors. The cold winter increased each cow's nutrient requirements and many cows entered calving with body condition scores of less than 5, which we feel is undesirable. We will certainly rectify this before next winter.

From an Extension/Outreach standpoint, we had a successful Beef/Forage Day in August and have our 2001 Beef/Forage Day set for August 30 this year. Feel free to attend. In addition, Cow/Calf Days seems to be increasing in size on a yearly basis. In three years the program has seen an increase in attendance from 450 attendees to 800 in 2001. This certainly indicates the positive attitude of cattlemen in Minnesota. If we can continue to attract valuable speakers Beef Cow/Calf Days will be a positive experience for everyone.

Our research program seems to be getting larger every year. We have completed the intensive rotational grazing study and should have a publication submitted sometime before the fall. The reproductive management strategies seem to have benefited many people in recent breeding seasons. Last year we completed a study using a CIDR device to resynchronize cows after a first artificial insemination (AI) at the beginning of the breeding season. In other words, our goal was to AI cows twice with a minimum of heat detection. The re-

sults were promising and we managed to achieve greater than 80% of the cows pregnant after the second AI. Once the products are approved we will publish the data so that producers have an opportunity to use this research.

This spring and summer we will be using AI, estrous synchronization, embryo transfer, and embryo splitting to try and improve pregnancy rates, weaning weights and shorten the calving season. We also are in the process of comparing different mineral types (organic vs. inorganic) on embryo production in superovulated heifers. Our third goal this year is to investigate the effects of added fat to the diet before the breeding season on cyclicity and pregnancy rates.

Since we need to sell approximately 50 to 70 females next fall to maintain the 200 to 210 head calving capacity they will become available for sale to Minnesota cattle producers. Many females will be pregnant to AI or will be open. If you have an interest in purebred registered or unregistered Angus females please feel free to give us a call. In addition, we have 120 commercial, black or black white face heifers available in August. These heifers will all be AI bred and most will be fetal sexed. Again, call us if you have an interest in these cattle and we will add you to our first-come first-served list. To contact Cliff Lamb or Dan Brown call 218-327-4490

Shoreland Vegetation and Landscape

Ms. Mary Blickenderfer, Extension Educator - blick002@umn.edu



The University of Minnesota Extension Service Shoreland Program recently joined forces with the University's Water Resources Center in order to better coordinate our promotional, programmatic, planning and funding efforts.

The Shoreland Design and Revegetation Workshop Series 2000 was offered at seven northern Minnesota locations. Over 135 workshop participants were guided through the shoreland design process and assisted in installing nine shoreland demonstration sites, including both upland and aquatic plantings. One goal of these workshops

was to initiate a local network of volunteers and professionals that would continue to assist local shoreland property owners in making appropriate management decisions. A follow-up survey of participants indicates that they continued to promote shoreland landscaping, spending a total of 600 additional hours "getting the shoreland word out" to a total of 3,500 people and a total of 400 hours participating in at least 20 additional shoreland project sites. An additional management and monitoring workshop will be scheduled for workshop participants at the demonstration sites this summer to evaluate the progress of each project.

The Shoreland Workshop Series will continue to be offered in 2001 in Cass/Hubbard, Sherburne, St. Louis/Lake, Aitkin/Mille Lacs, Crow Wing, and Kanabec Counties in cooperation with local agencies. Influenced by recommendations from past participants, the series has been expanded to three, 7-hour workshops: Design, Planning, and Planting. This expanded timeframe will allow for even more thorough coverage and experience of the entire shoreland landscaping process.

New plant propagation and bioengineering materials/techniques continue to influence the shoreland revegetation process. Local nurseries continue to expand their selection of shoreland plant species available for these and other projects. Several inexpensive and environmentally friendly materials and techniques using biodegradable products are now available to shoreland owners to control shoreland erosion. We continue to update workshop participants through newsletters and additional workshops as the science of shoreland restoration continues to rapidly evolve.

Tourism

Dr. Veronica Long, Extension Educator - vlong@umn.edu



This year I am involved in several innovative projects involving communities and tourism. One major project is the coordination of the community tourism development project in the Grand Rapids area. I will be helping the communities in the area with a development process which will involve identifying community values, assessing attractions, services, and organization.

Another exciting project is working with the Minnesota American Indian Tourism Association (MAITA). I have been coordinating and facilitat-

ing the formation of this group. It is one of approximately six state Indian tourism organizations in the United States. MAITA has been meeting almost monthly since December. It plans to have a Board of Directors in place by this summer. The mission statement of MAITA is: MAITA promotes responsible tourism as a means of economic development while respecting the integrity of tribal cultures, traditions, and natural resources for the benefit of all.

Another interesting project involves the development of a school-to-work project. I will be working with community members and school district personnel from Cook County to create a youth apprenticeship program in the hospitality and non-profit sectors.

My other activities include teaching the Tour-

ism Center's customer Service Program "Minnesota at Your Service." I am a member of the Grand Rapids Area Chamber of Commerce Tourism Committee and Customer Service Council. I am also on the Grand Rapids Area Convention and Visitor Bureau Attractions Committee. I am coordinating speakers to be interviewed on KAXE during National Tourism Week (May 6-12). I have had a proposal accepted for a panel presentation in the International Community Development Conference in Duluth this July. The presentation title is "Tourism Partnerships: Working Across Cultures to Foster Sustainable Economic Development."

Those are some of my current activities. The remainder of 2001 should be busy!

Horticulture

Dr. David K. Wildung, Horticulturist - dwildung@umn.edu



Spring is a time for new beginnings and renewal of growth for plants. This spring promises both as we look forward to a busy

summer. I am pleased to announce that Pat Johnson joined our horticulture staff on April 23, 2001. She has an excellent background and will bring valuable qualities to our program. Look forward to good things from her as we move into the

future. Following a winter with more snow and cold than the previous three winters, perennial plants seem to be emerging in good condition. The deep snow helped blueberry, strawberry, and chrysanthemum plots winter well. Unless we get some unseasonably cold temperatures or late spring frosts we should be able to look forward to good evaluation seasons for these studies.

Some exciting new plots will be planted this spring. The first is a new orchard that will contain the most winter hardy varieties surviving the severe winter of 1995-96. Survivors from that winter were regrafted and their trees are now

ready for planting. We continue to get promising reports on 'Zestar' the newest U of M apple release. Several old blueberry breeding selections will be removed this year in preparation for the planting of new selections in 2002. A new strawberry yield trial will be planted this year that contains the 25 best selections from our breeding program. Second year fruiting on the old study will be completed this summer. We got excellent information from this planting last season and hopefully it does as well this year. Raspberry and

Horticulture: continued on page 6



Tree Improvement

Dr. Andrew David, Forest Geneticist - adavid@forestry.umn.edu

As this edition of the NCROC News Notes goes to press the St. Louis County red pine seed orchard is being rogued of genetically inferior individuals that were identified based on data analysis this past winter. Future seed coming off of this seed orchard will produce seedlings with a volume increase of 4.2% over previous seedlings. Although the percentage increase may seem small, because red pine is the most planted tree species in Minnesota even small percentage increases mean a large total increase in volume. We have also analyzed and ranked over 250 families in our 15 year-old white spruce progeny test. This ranking is already paying dividends because we have used it to

collect branches from the better families to create grafted clones for inclusion into several improved white spruce seed orchards. Among these is the improved white spruce clonal seed orchard that Blandin Paper Company is establishing near the Center. This winter we also measured a three year-old European and hybrid larch progeny test on Mead Corporation land. The average seedling height for this test was just over 6.5 feet! This rapid growth highlights the potential for larch in the Lake States and explains the interest that many organizations have in planting larch.

In the greenhouse we are putting the finishing touches on the aspen breeding for the year and are in the process of propagating the cuttings for our first aspen clonal test, which will go out in the spring of 2002. With the harvesting that has been done in some of the Centers woodlots during the past year we are also growing seedlings to be used

for reforestation. Red pine, white pine, lodgepole pine, jack pine and white spruce will be used to replant these areas.

If the trees cooperate and provide flowers this spring we will be breeding European larch at the arboretum near the South Farm on Harristown Road in preparation for another progeny test and finishing the second-generation breeding for white spruce. The white pine we have at the Cloquet Forestry Center are young but may begin flowering this spring. If they do we will begin crossing them to identify parents that produce progeny with elevated resistance to white pine blister rust.

Just in case you are wondering, the 'we' I am constantly referring to are: Paul Anderson, Kathy Haiby, Egon Humenberger, Libbe Johnson, Tim O'Brien, Carrie Pike and Jim Warren. Without them none of this would be possible.



Wild Rice

Dr. Raymie Porter, Wild Rice Geneticist - raporter@umn.edu

Approximately 37,000 lb. of 'Petrowske Purple' seed was distributed to Minnesota growers on September 4. The new cultivar was developed at NCROC primarily for resistance to the major fungal disease, Fungal Brown Spot (FBS), but it is also superior to current varieties in shattering resistance and lodging resistance. It is similar in height (medium) and maturity (medium) to the most recent release, Franklin. It was developed by improving the grower-developed variety Petrowske Bottlebrush for these traits. Petrowske Purple performed better than Petrowske Bottlebrush and Franklin for yield, shattering resistance, lodging, and FBS rating. Besides the increased yield, this new variety should allow Minnesota wildrice growers to withstand FBS disease outbreaks with less yield reduction, lodging, and shattering, possibly reducing or eliminating the need to apply fungicide.

Variety trials this year were successful in three locations representing the three major growing areas of wildrice in Minnesota: Waskish, Clearbrook, and Aitkin. The fungicide propaconazole (Tilt®) was applied to half the plots of each of the 20 cultivars and breeding populations at each location. Although there appeared to be a substantial increase in yield in some variety plots protected with Tilt®, the differences were

inconsistent over locations and not statistically significant. The cultivar Petrowske Purple did not increase in yield as a response to Tilt® application, which is perhaps an indication of its resistance to FBS disease. When all 20 varieties were averaged together, there appeared to be a slight increase in yield due to Tilt®, but it was too small to be statistically significant. In 2001, we may test selected cultivars for Tilt® response in experiments designed specifically for that purpose and with greater statistical power to detect differences.

Variety development activities are continuing, of course, focusing on increased yield, shattering resistance, and earliness. One breeding line, thought to be fixed for the qualitatively inherited "nonshattering" trait, was tested in a preliminary trial at one location. This line will be further tested in 2001 to determine its fitness as a possible variety, and to confirm whether it is fixed for nonshattering. We are also working to develop a very early variety. If such a variety is early enough, it may be used by growers who wish to "clean up" early-maturing shattering varieties which tend to persist in paddies even after extensive fallowing. Also, in response to growers' concerns we are also beginning to take data on seed size, adding it as a selection criterion for improvement of breeding populations. Due to recent acquisition of a huller and seed counter, and the possible acquisition of recent software and hardware to calculate seed dimensions in scanned samples, we can begin to address seed size in the development of future varieties.

Horticulture: continued from page 5

black currant plots should do well. Positive changes in the strawberry weed burner were made last year and the current version works well for strawberry renovation. This project will be complete with yield data collection this season. Funding for 2001 was secured to continue the organic blueberry production project at the Staples Ag Center.

Many new varieties will be featured this season in our flower plots. Several new companies such as Proven Winners, Fischers, Jackson & Perkins, and Agrexco, LTD. have added their varieties along with varieties from the past sources in what promises to be a terrific list of new annual flower entries. Our hanging basket trials will be expanded greatly and we will add a small container planting. In addition, the U of M chrysanthemum program has announced that new selections exhibiting shrub like growth in their second and succeeding years will be released as 'My Favorite' herbaceous perennials. These were referred to as the 'Maxi-Mums' that have done so well in our plots the last few seasons. We will be putting in a small plot of these for hardiness and carry over evaluations this season.

You are always welcome to visit our horticulture plots. Our horticulture visitors day is Wednesday, August 29, but feel free to visit the plots on your own to see the exciting new things occurring in gardening. If you would like to assist in funding any of these horticultural research projects at NCROC please consider a financial contribution to our horticulture campaign and help us "Grow into the 21st Century".



Tourism

Dr. Daniel Erkkila, Extension Educator - erkkila@umn.edu

Since the start of this year, programming, research and other activity within the University's Tourism Center seems to have really taken off! While 40% of my appointment is with NCROC, 60% is with Extension's Tourism Center. After 8 years as Center Director, Dr. Bill Gartner stepped down as the administrator to resume research and teaching activities on the St. Paul campus. Extension Dean and Director, Chuck Casey, asked me to assume the interim job as director and I accepted. At the same time, Dean Casey asked the College of Agriculture, Food, and Environmental Science's (COAFES) Senior Associate Dean, Phil Larsen, to lead a group to conduct a review of the Tourism Center, similar to reviews done with other centers within COAFES. That effort is nearly completed and I look forward to and expect a healthy dialogue with

recommendations to come from that initiative.

Our research work for Minnesota's \$8 billion tourism and travel industry continues at a fast pace. In December we finalized a major project for the Minnesota Department of Transportation that looked at reducing the barriers to international travel to Minnesota. By necessity, it focused primarily on the Minneapolis-St. Paul International Airport and supporting, networked infrastructure. Another study funded by MNDOT that began recently is looking at the attributes and amenities of highway systems that are important to tourists.

A new and substantial project began to profile the many visitors that come to Minnesota. Five communities across the state are having their leisure and business travelers interviewed over a 12-month period to ascertain things like where they are from, why they came, what they are doing while they are visiting, and how much money they are spending. This and other information being collected is critical for communities and businesses in order to understand the travel market and plan accordingly. This project, being carried out in Ely, Brainerd, De-

troit Lakes, Shakopee, and Pipestone, is funding by the Minnesota Office of Tourism and the Tourism Center's Carlson Endowment.

Finally, a project similar to the (above) visitor profile is underway in the Grand Rapids area. A 12-month traveler survey is also being conducted, while a rigorous community strategic planning effort to dovetail with the customer data will begin late this spring. Running through the summer, community groups, elected officials, and citizens will express their views about such things as tourism infrastructure needs, community values and a vision for tourism's future within the context of sustainable development. That project is being funded by the Blandin Foundation, the Grand Rapids Chamber of Commerce and Convention and Visitors Bureau, and the University's Northeast Minnesota Sustainable Development Partnership.

Please feel free to contact me if you have any questions about these activities or other tourism issues. My mailing address and telephone number is 1861 E Hwy 169, Grand Rapids, MN 55744, 218-327-4361. My e-mail is listed at the top of this article.



Plant Pathology

Dr. Robert F. Nyvall, Plant Pathologist - nyvall001@umn.edu

If you're having problems identifying what is wrong with your plants this spring and summer, feel free to bring a sample to my office or laboratory. Last summer, a couple of hundred gardeners brought in their plant samples to determine what was wrong. Although, I can't always guarantee an answer to a plant problem, many maladies are common plant diseases or disorders that are common to northern Minnesota.

In our region we are blessed, or more appropriately cursed, with many plant diseases. Let's briefly discuss some disease problems that may occur in your garden this summer or perhaps on your fruit trees.

Tomatoes get a series of diseases that begin relatively soon after transplanting. The first disease that many people may notice is one where the leaves begin to get relatively large, "bullseye-shaped" lesions on the leaves. This is a disease called early blight and it is relatively uncommon. The most serious disease of tomatoes occurs about the time the fruits are maturing on the plant. The leaves become brown and

begin to drop. If one were to examine them closely you would see numerous small, dark brown to black spots that occur not only on the leaves but also on the maturing fruit. This is a disease called Septoria leaf spot. This disease can be very hard on tomato plants and it is difficult to control. Fungicides are effective but the best way to manage the disease is to move the planting area from year to year. The disease is caused by a fungus that overwinters on old dead leaves on the soil surface. Try and remove as many of these leaves as possible and burn them or haul them to the land fill. Composting normally does not kill the disease organisms. When you transplant tomatoes a straw mulch around the plant is also useful.

When you buy peas, make sure they are resistant to Fusarium wilt. Many of our old pea varieties tend to be susceptible to this disease. Plants will wilt and become gray, then brown relatively early in the summer. What happens is the stem or water-conducting tissue becomes plugged with the causal fungus that grows up the roots and into the stems from the soil. There are many resistant pea varieties that control this disease. The leaves of apple trees, especially crab apple trees, become covered with black spots. Very quickly the tree becomes defoliated and the fruits may become covered with these black spots. This is apple scab a very common disease of apple trees.

Fungicides afford a good management technique if applied early and frequently. The disease originates from the old leaves that are on the soil surface so it is useful to rake up and eliminate these leaves.

A frequently asked question is what are those "black things" on the choke cherry trees? These black objects are also found on plum trees and other Prunus species. This is a disease called black knot. This is a fungus-caused disease that originates from these black knots in the spring when the weather warms up and it is moist. The fungus spores infect new tissue and in two years the black knots appear. The disease can be harmful to these trees and in most cases is disfiguring. The disease can be managed by cutting off the knots when the tree is dormant. The knots should be put in the garbage and removed. A fungicide containing lime-sulfur can also be applied but only in the early spring or late winter before the buds come out. This fungicide can be phytotoxic.

These are a few examples of the diseases that can occur in our part of the world throughout the year. If you have a plant problem, feel free to bring a plant sample to my laboratory or office and I'll try and identify the cause. If you are coming to Grand Rapids from any distance away it is a good idea to call beforehand to make sure I'm home in my office or laboratory. Have a good growing season.

Silviculture

Dr. Daniel W. Gilmore, Silviculturist - gilmo009@umn.edu



You may recall from the last issue of the North Central News, that a silviculture system has three components: regeneration, stand tending, and harvest. Silviculture systems are prescribed to individual forest stands. Forest stands are groups of trees that are similar in age, height, species composition, and grow under similar conditions. Under an even-aged silvicultural system, each of these components would be addressed during separate periods of time. The simplest silviculture system is clear-cutting. This system lends itself well to tree species that require a lot of sun such as aspen, red pine, or jack pine. Following the complete removal of the forest stand, or clear-cut, the forest stand is regenerated either through planting, or natural regeneration enhanced by site preparation. Stand tending, or thinning operations are then performed to reduce competition and enhance tree growth. Two other even-aged silviculture systems are the seed tree and shelterwood systems. Under these two systems, some trees are left in the stand to provide seed and shelter for the young seedlings. A seed tree system is more suited for tree species that require full sunlight. More trees are left in a shelterwood system for tree species

that are less light demanding such as the spruces and northern hardwoods. As the name implies, the seedlings are sheltered from the sunlight.

Regeneration dynamics of aspen and birch - Funded by the Blandin Foundation

Information from this project will be used to assess the economic efficiency of tree improvement programs and silvicultural practices. The nursery component of the project is ready for spring and aspen and birch trees will be measured throughout the growing season. Several groups including the Headwaters Chapter of the Society of American Foresters (SAF) has toured the nursery site.

Modeling early regeneration processes in mixed-species boreal forests of Alberta - Funded by MDFP Research Trust, Canfor, and Daishowa-Marubeni

Carrie Becker, a masters student working on this project, has been hard at work entering, editing, and analyzing data this winter. We will be presenting a poster this June at the SAF North American Forest Ecology Workshop being held in Duluth summarizing the data collected last summer. Carrie and Molly Matysik, who worked on the By-Products project last summer, will spend a month in Alberta this summer collecting additional data.

By-product application to forest soils -LCMR project ML 1999, Chap 231, Sec. 16 Subd. 10(g)

The objectives of this project are to examine and report on the effects of co-application of biosolids,

wood ash and/or paper mill residuals on seedling germination, survival, and growth. We installed 12 treatments at NCROC and 14 treatments at Cloquet using varying levels of biosolid application, wood ash, their combination, and complimented this design with fertilizer and lime treatment. This summer, with the help of Tim O'Brien and John Blanchard we will keep these plots weed free and measure the trees as they grow.

Effects of blow-down and fuel reduction activity on forest succession pathways in northern Minnesota - Funded by and in partnership with the USDA Forest Service

A copy of a poster presented as the SAF National Convention in Washington, DC by Paula Anderson and John Zasada of the USDA Forest Service, and myself and Louise Yount, of the University of Minnesota is on display both at NCROC and the USDA Forest Service. Louise and I will be leading a field tour to some of our field sites this June during the SAF Forest Ecology Workshop being held in Duluth. John recently presented a summary of our work during an evening session at the Science Museum in Minneapolis. Paula and Doug Kastendick continue to enter and summarize data and prepare for the upcoming field season.

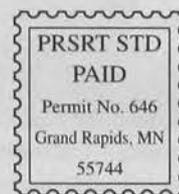
Next newsletter: Uneven-aged silviculture and more project updates

UNIVERSITY OF MINNESOTA
North Central News

North Central Research & Outreach Center
1861 East Hwy 169 • Grand Rapids, MN 55744-3396

Dr. David L. Rabas, Head • Amy S. Johnson, Editor
218-327-4490 • www.ncroc.coafes.umn.edu

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