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North Central Research & Outreach Center

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Planning Our Future

by David L. Rabas

We (NCROC faculty and support staff) are engaging in a process of developing a plan for our future. The planning process has been and continues to be an ongoing process at NCROC. The process has three primary goals: 1) to improve the quality of the Center's research and outreach programs; 2) to develop a process for continuous evaluation of customer needs and; 3) to align our plan with the mission of NCROC and those units of the University which are our partners in a common mission to serve the people of our state.

The continuing decline in state support for the University and the collegiate units with whom we interact makes it imperative that we develop a plan that is responsive to our customer needs and attracts resources from non tax sources to allow us to continue to improve our service to our customers. In order for the planning process to succeed, we need to have broad input from our customers. At the end of this article, we ask our readers to help us in the planning process by sharing their ideas about a vision for our Center and a plan for our future.

This current planning process began over a year ago with the participation of some members of our staff in a discussion of quality at a series of conferences sponsored by the Blandin Foundation and the Minnesota Council on Quality. At the Quality Conference we learned that a plan that is aligned with quality principles would contain the following elements: It must be focused; must have a set of common goals; must be used to set priorities, and guide improvement efforts; must be used to justify needs; must be customer focused and must be flexible and adapted to change. We intend, with your help, to incorporate these quality principles into our "Plan for the Future".

We continued the planning process with a meeting facilitated by Northeast District Extension Director Terry Anderson. At that meeting, we identified a series of issues that were important to our staff and customers. Addressing these issues will be an important part of the planning process.

Currently, we are engaged in a process of evaluating our existing "strategic plan". This will be an ongoing process, which will include a significant role for our Center's Advisory Committee. As we move forward in a process of "continuous improvement" we hope in the end to have a plan that will allow us to find the resources needed to sustain our Center and improve the scope and quality of the research and outreach services we provide to our customers.

We are asking our readers to help us in the planning process by responding to the following questions:

1)How do we better identify and respond to the diverse research and outreach needs of our customers?

2)How do we improve the quality, focus, and value of our research and outreach programs?

3) How do we increase our financial resources to support our research and outreach programs?

4) How do we increase our involvement in the overall teaching, research, and outreach mission of the University?

5) How do we improve our Center's human and physical resources and provide a climate that encourages creativity, productivity, safety, and diversity?

6) How do we enhance public awareness of and support for our Center's research and outreach programs?

Please take a few minutes and share your ideas about how to improve our Center and help us develop a better Plan For Our Future.

News from North Central

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

2002 was another excellent research year at NCROC in spite of some difficult weather conditions. An exceptionally warm winter was followed by very cool conditions in April and May and very dry conditions that persisted from April through mid June. Spring dry periods, especially if they follow a winter with limited snow cover, often lead to reduced pasture and hay yields. 2002 was no exception. First crop hay yields, except for alfalfa, were about one half of normal and pastures growth was extremely slow. Late June, July, and August provided abundant rainfall and very warm temperatures, which helped produce improved hay and pasture yields and allowed our much delayed full season crops such as corn and vegetable crops to mature. The growing season ended with a killing frost for most crops on the 24th of September and the third coldest October on record. According to Art Elling, weather observer for the USDA Forest Services Laboratory, only October 1919 and 1925 were colder.

As I mentioned in the article on giving, we are currently engaging in two special fund campaigns. The Horticulture campaign is near its end, and the Beef Research and Investment Fund Campaign has just begun. As state tax support continues to decline, we need to find ways to sustain quality research and education programs. One way is to ask for support from our friends and customers. Another way is to reduce the scope of our activities, i.e. downsize/rightsize our Center to align our research and outreach programs with available resources in order to continue to provide high quality services to our customers. Both options will be needed if state resources continue to decline.

You Can Help

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

In a climate of declining state resources, we are increasingly more dependant on grants and gifts to sustain our research and education programs. NCROC has several special efforts to ask our friends for help in supporting our Center. In addition to the North Central Research Fund, which supports all Center activities, we have two special fund campaigns to address specific research needs. Our Horticulture Research Fund Campaign is seeking funds to support our Center's Horticulture research and outreach programs, and our Beef Research Fund Campaign is seeking funds to sustain and improve our Center's beef research program. Friends of NCROC can help support our research programs in a number of ways. The following article describes a number of options that might be used in addition to direct cash contributions to help our Center better serve our customers.

Wills, Trusts, Endowments, and Charitable Gift Annunities

LIFE INCOME AGREEMENTS allow you to create a named endowment and generate an annual income for you and/or other beneficiaries. Tax advantages include increased income (some of which may be tax free), estate tax charitable deductions, and a full or partial bypass of capital gains if you give appreciated securities.

CHARITABLE GIFT ANNUITIES can be established with a gift of $10,000 and is funded with a gift of cash or marketable securities. You and one other person can receive income from your gift for life at an annuity rate of up to 12%, depending on you age. Your annuity rate and your income tax deduction are based on age at the time the gift is made.

CHARITABLE REMAINDER TRUST provides the donor or designated beneficiary annual income payments. It combines charitable giving with other financial goals, including life or long-term income and a bypass of capital gains if appreciated property is used. You can establish a charitable remainder trust with a gift of $100,000 or more by transferring cash, stocks, bonds, and/or real estate to establish the trust. The trust will pay a life income to you and others, at either a fixed amount (annuity trust) or a percentage of the trust's market value (unitrust).

CHARITABLE LEAD TRUST If you have more income than you need to maintain your lifestyle, and want to support the university before transferring assets to family members, then a Charitable Lead Trust (CLT) may be a good estate planning tool for you. A CLT pays income to the University for a term of years, and then transfers assets to your family at a reduced federal gift and estate tax rate.

CREATE A LEGACY THROUGH YOUR WILL OR YOUR RETIREMENT PLAN

- A substantial gift can be made without affecting your family's current financial security.
- Both principal and the income of your assets ARE available to you during your lifetime.
- The ultimate use of the funds may be designated as you see fit.
- A scholarship or fellowship endowed through a bequest carries in perpetuity the name you designate.
- You enjoy the good feelings that come from knowing that your gift will be an investment in wisdom and knowledge.
- Tax savings for your estate are maximized.

Legacies make important statements about who we are, what we believe in, the people and institutions who have shaped us, and how we want to be remembered. Leaving a Legacy to the University of Minnesota is a testament to your feelings for the University and ensures that what you experienced will be carried on to future generations.

Agricultural Engineering

Dr. James J. Boedicker, Agricultural Engineer jboedick@umn.edu

Most articles herein pertain to research and outreach programs at this Center. This one is a bit different. It stems from an unexpected visit I had a few weeks ago and is intended to encourage students with interests in agricultural and other biological systems and with aptitudes in science and mathematics not to overlook agricultural engineering as a viable college study and career option.

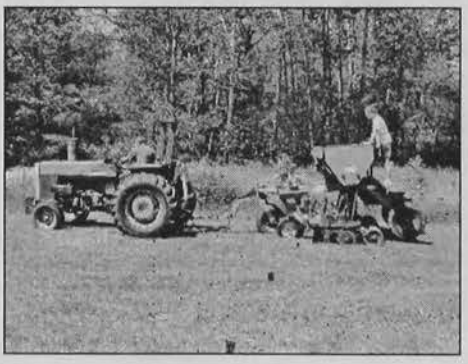
The visitor was a 2nd year pre-engineering student at Itasca Community College (ICC; on the NCROC campus). Upon completing ICC, this student was considering transferring to a four-year college in agricultural engineering and wanted to learn more about it. This encounter was indeed a pleasant surprise, not only because of my admitted bias toward the field, but also because after over 31 years on this job, it was a first! Also significant, perhaps, based on my college experience, is that the student is a female. Besides explaining some of my work over the years, the following is briefly what else I told her.

Agricultural engineering emerged as a separate engineering field about 100 years ago. It developed in response to a need for solutions to engineering problems in food and fiber production and related industries that were not being adequately addressed in the traditional engineering fields of that time. Today, agricultural engineering programs exist at most land grant universities in the US and at many other educational institutions worldwide. Most include activities in teaching, research, and extension or outreach.

Agricultural engineering is considered unique in that it combines relatively fixed laws of physical systems with the greater variability of biological systems to solve problems in food and fiber production, and related fields. In recognition in part this fact, most agricultural engineering departments, at least in the US, recently changed their names to incorporate the term "Bio" (Biosystems and Agricultural Engineering at the UM). Another reason was an increasing need to attract students from non-traditional pools, given the steady decline nation-wide in the number of students with farm backgrounds and an apparent reluctance by others to align themselves with "agricultural" programs. Curriculums have also evolved somewhat from such traditional areas as power and machinery, soil and water, structures, and crop processing to include stronger biology and environment related components. While traditional areas remain important, these changes have resulted in not only more students, but also a greater percentage of women.

In my visit with this student, I also mentioned my membership in ASAE, the Society for engineering in agricultural, food, and biological systems. With over 10,000 members worldwide, this organization is dedicated to promoting the profession and the solution of problems through information exchange, development of standards, and a variety of other means.

More information on agricultural engineering at the UM and elsewhere as well as other programs such as the pre-engineering programs at ICC is readily available on the web.



Agronomy

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Kura clover is a perennial forage legume noted for excellent long term persistence, once established, but early varieties were difficult to establish. A kura clover variety trial was established in late June 2002 to evaluate recently developed varieties and experimental germplasm from the U of M breeding program for establishment vigor and, starting in 2003, forage yield and persistence. Two newer varieties, Cossack and Endura, had 85 and 65 percent stands by late August, compared to the earlier variety Rhizo, which had less than a 10 percent stand. Several experimental germplasms from Dr. Nancy Ehlke's breeding program in the Department of Agronomy and Plant Genetics at the U of M also had stands of 80 percent or greater. Dr. Ehlke shared with participants at Beef/Forage Day, August 29th, some of the breeding strategy she used to develop genetic lines with improved seedling vigor. Selecting large plants from a diverse population, then intercrossing them and continuing this process through several selection cycles resulted in a population of plants with superior establishment characteristics. She also shared that applying 25 pounds of nitrogen per acre to new kura clover seedings, appears to enhance establishment. Apparently, the added nitrogen is needed for plant growth until biological nitrogen fixation reaches an acceptable level.

A grazing study evaluating perennial ryegrass in northern Minnesota, established in 2000, was continued in 2002. Evaluation of perennial ryegrass stands in early spring 2002, the second production year, revealed significant stand loss, whereas stands of orchardgrass and tall fescue remained satisfactory. It was suggested by perennial ryegrass marketers that the stand loss was due to inappropriate grazing and fertility management, rather than lack of winter hardiness. Reportedly, perennial ryegrass responds favorably to a shorter harvest interval, higher nitrogen fertility and a shorter cutting height than perennial cool season grasses commonly grown in northern Minnesota. To investigate these reports, a new perennial ryegrass trial was seeded in July 2002 to evaluate several harvest and fertility management strategies. The most vigorous strategy consists of harvesting every 30 days, a 40 pound per acre nitrogen application in the spring and following each harvest, and a cutting height of two to three inches. This vigorous management strategy will be compared to a more traditional management of a 45 day harvest interval, nitrogen application of 50 pounds per acre in the spring and after the first harvest, and a cutting height of four inches. The trial includes a large number of genetically diverse perennial ryegrass varieties with a broad range of relative maturities, and a similar trial is also being conducted in Michigan.

Animal Science

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

The 2002 spring, summer, and fall have been both rewarding and frustrating. I heard many producers curse the long spring, especially those beef cattlemen who were calving in late March and early April. Although calving took a toll on our beef crew (Dan Brown, Ray Steffen, Terry Hansen, Jim Schmitt, and Kristi Balder) they kept their heads high and did a great job keeping calves alive and saving many calves that would likely not have made it. In spite of the poor calving weather, our calves had an excellent summer and weaning weights seem to mirror weaning weights from last year. The average for bulls and heifers was between 550 and 280 pounds.

With the poor forage growing conditions in northern Minnesota our cows seemed to struggle to put on condition like they have in the past. To combat this, we weaned our calves a month earlier. The stress of nursing calves and producing milk for calves should allow the cows to gain condition faster and prepare the cows for a long winter. We intend to calve 200 to 210 females during the spring of 2003.

With the yearly improvement of the genetics of our cattle and the understanding of producers that we can enhance the genetic value of their cattle, we are starting to make an impact to the Minnesota cattle herd. Many people who purchased cattle from us in 2001/2002 have reported back that they are happy with the results and performance of the females and bulls that were purchased. In fact, we have even heard that heifers bought at the Minnesota State Angus Sales have done extremely well in the show arena. We are proud that our performance based herd has become a recognized source of genetics. We hope this trend continues so that we can continue to provide a leadership role in cattle genetics.

Our philosophy on providing bulls for sale is to keep less than 25% of the bull calves as bulls. The remaining 75% of bulls are castrated. In this manner, we do not keep bulls that we feel will not perform in our operation. This year we have kept back 18 yearling bulls, which are offered for sale. In addition, we have six two-year bulls, which we used last year as clean-up or replacement bulls. As always, we will sell these bulls on a private treaty, "first-come-first-serve" basis, and prices are established at between $1,600 to $2,000 per bull. Bulls can be selected at any time, but we will only release them after they have passed a breeding soundness exam.

With our herd at capacity, we will have a few females for sale in early January. Depending on the pregnancy status and genetic value of those females, prices will range from $600 to $1,200 per female. Again, they will be sold on a private treaty with a "first-come-first-serve" basis. If you are interested in purchasing bulls, pregnant cows, or open cull cows please feel free to contact us at the NCROC.

Extension/Outreach programs continue to attract more and more people with another excellent turnout for Beef/Forage Day in August. Our next large Extension endeavor is 2003 Cow/Calf Days, which is scheduled in ten different locations throughout Minnesota. The Grand Rapids location will be an evening program on February 7, 2002. Please plan to attend. The speakers will again be excellent.

Our research program is growing, specifically in the area of twinning. Gradually we are figuring out more and more productive, economical methods to induce twins in cattle herds to return more of a profit to cattlemen in the future. Our research program still continues to focus on other practical methods of reproductive management such as artificial insemination, embryo transfer, estrous synchronization, and ultrasound. In addition, some of a pasture management research will be published in a scientific journal in 2003. We could not do all this work without the help of excellent scientists and graduate students.

Our embryo transfer laboratory is up and running and is fully functional. This facility has allowed us to continue research during extremely cold periods of the year. We are grateful to everyone who contributed to getting the laboratory to a point that we can use it this winter. With the embryo facility up and running we are now focusing on the NCROC Beef Research Fund Campaign, which was initiated during the summer. Many of you may have received a flyer in the mail. Please seriously consider donating or pledging to the campaign. The campaign has started well and will continue to grow to meet our goal of $300,000.00.

To contact Cliff Lamb or Dan Brown call 218-327-4490

The Animal Science crew at NCROC wishes you a productive winter and we welcome you to visit our beef research facility any time.

Forest Management

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Using funding support from the Minnesota Forest Resource Council, new forest management scheduling models were applied to three large test cases in northern Minnesota. The overall objective was to look at ways of better integrating economic and ecological objectives in forest management across public ownerships. Tests utilized DNR stand level inventory data, associated GIS maps, and much of the data recently developed as part of the USDA Forest Service planning process in Minnesota. Detailed site-level treatment options were considered including 17 different silvicultural treatment types and specific forest cover type restoration objectives that varied by landscape ecosystem. Chippewa National Forest lands and Minnesota DNR lands in Itasca and Cass counties were the lands of focus, with public ownership patterns about as intermixed in this area as anywhere in the State.

Spatial objectives focused on explicitly valuing the production of older forest interior space over time. Road networks were recognized to account for their fragmentation effects. A 150-foot buffer was assumed to be required for interior

space with forest age requirements for the surrounding buffer area generally 20-40 years less than the age requirements for older forest interior space. For each of the test cases, multiple scenarios were used to examine the impact of a range of values for interior space on timber production levels.

Study results suggest that:

1) New spatial modeling tools for forest management scheduling can be applied successfully to large areas. These tools can recognize enormous detail. A real strength of the overall modeling system applied is its ability to decompose a large problem into smaller problems that are well linked and manageable in size. This characteristic makes it likely that enhancements can be developed to address additional spatial facets of the problem.

2) Problems associated with forest fragmentation on public lands likely need only be a relatively short-term problem. Forest fragmentation received little consideration in past forest planning efforts so it is not surprising that forests are not well suited for producing large blocks of old forest today. With new planning tools one can plan ahead to help better control the future spatial arrangement of the forest.

3) Although simple management guides like "harvest today in larger patches" is a way to improve spatial conditions for the very long term, it is potentially quite detrimental, as it will tend to destroy large patches of older forest that are may be very important in the short term. Effective strategies likely involve a variety of harvest block sizes with analysis key for identifying good spatial and temporal strategies that fit well with existing landscape patterns.

4) Much of the gains from better landscape management on public lands can be gained simply through better detailed planning and analysis by the large public ownerships. Coordination can certainly help some, but the big gains come from good planning by each of the large public landowners. At least for the definition of interior space assumed for this study, by far most site-level spatial interdependencies involve single ownerships.

5) The trade-offs between economic and ecological objectives are potentially large and costly. Although costs of comprehensive planning and analysis is substantial, the potential net gains are likely quite large. Furthermore, once decision support systems are in place, they have the potential to add insight on a broad range of forest management decisions and forest policy issues.

Horticulture

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

What a growing season! People always talk about extremes in the weather, but the 2002 growing season truly will be one to remember. Beginning three weeks late because of unusually cool cloudy weather and ending earlier than usual with one of the coldest Octobers on record, it's amazing we had any summer at all! However, in between we had 12 weeks of above average temperatures and actually had 2288 growing degree days through 9/22/02, 396 growing degree days above our average. Warm season vegetables and flowers did remarkably well. The Grand Rapids area was fortunate to not receive the very heavy rainfalls that many other parts of the state received. In fact, our crews were busy irrigating plots most of the summer. It is the unusual seasons, like this one, that makes horticultural field research exciting and challenging at NCROC.

What were some of the highlights of the season? Our annual flower trials were outstanding and of interest to many tour groups and individuals who visited the plots this season. Many new species were trialed such as ornamental millet, lantana, dichondra, perilla, plectranthus, alternanthera, and others. Many common types like petunias offered new cultivars like the Tidal Waves, the Explorer series, the double waves, and others that all did well. Hanging baskets, shade plants, and containers also did well. Results of these trials will soon be available upon request or on the U of M, NCROC web page. Another planting that progressed well was our new orchard planted in 2001. It made it through its first winter unhurt, and made wonderful growth this summer. In fact, if it overwinters well this winter, we may see a few apples in 2003. Next spring will be a critical time for training these trees for future growth.

Two new projects were started this summer: the strawberry angular leaf spot study and the high tunnel vegetable study. Both were funded by the Minnesota Fruit and Vegetable Growers Association.

Strawberry angular leafspot is a disease that affects the appearance and quality of the ripening strawberry fruit. We hope to be able to determine the economic impact of this disease on fruit yield. To do that, we will create humid spring conditions and inoculate the disease in part of a field planting. With the help of Sandra Gould, in the Plant Pathology Disease Clinic, we made good progress in isolating and culturing the disease this summer. This winter we will be developing inoculation techniques to be used on the plants in the field. Next summer we will then determine if these inoculations and the disease affects fruit yield, appearance, or quality.

The first of two high tunnel structures was completed in late June. We were able to plant tomatoes and cucumbers and learn much about growing, irrigating, trellising, and pruning systems. There are some unique challenges in growing plants in these structures, but the potential to increase the growing season by from 2-6 weeks both in the spring and fall is exciting for commercial vegetable growers of the region. A second structure is being completed this fall to be ready for use next spring. Thanks to Tom Carey, Doug Hendrickson, and Jim Boedicker, NCROC staff and faculty, for their help on this project.

I think one of the highlights for me this year has been working with the crew we have. Whether it was Gary Cutter's meticulous watering in the flower trials and greenhouse or the fall crew of Barb Axelson, Ron and Carol Stork, Dennis Neary, and Frank Nason carefully weeding, digging and planting strawberry breeding selections and hurrying to get strawberries mulched before cold winter temperatures arrive, they have been great. Becky Locke, a summer horticulture intern, from U of M Crookston was a joy. Her enthusiasm and quest to learn brought much to our program. Along the way, she learned to drive a tractor and some horticulture that should help her succeed in her horticulture career! The skills of Keith Mann, Research Plot Coordinator and Pat Johnson, Assistant Scientist, led the way and enabled us to successfully complete a busy season of activities. Thanks!

Shoreland Vegetation and Landscape

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

In spite of droughts, floods, a late spring, insect outbreaks..., the University of Minnesota Extension and Water Resources Center Shoreland Education Program continued to grow. Shoreland workshops were offered in new regions of the state and two additional workshops were added. Thanks to local units of government, organizations, and agencies for sponsoring workshops and providing financial support, and to Minnesota PCA for continued financial support of shoreland programming. During the past year, 200 workshop participants (including citizens, local officials, and natural resource professionals) were trained in shoreland landscape and design, resulting in 2,400 linear feet of restored shoreline (8 sites total). With initial assistance and some seed provided by U of MN Extension Service (UMES), local northern MN nurseries provided 100% of the native plants for the northern restoration projects.

Two new workshops were piloted successfully this season as the result of participant and agency requests for additional shoreland programming: a 1-day Shoreland Landscape and Design Workshop and a 1.5-day Aquatic Plant Identification and Sampling Workshop Series. These will continue to be offered in future years along with the existing 3-day Shoreland Landscape and Design Workshop Series. We plan to develop and pilot at least one new program in 2003 to address the ongoing management and monitoring of shoreland restoration projects. We also plan to expand our program coverage in 2003 to include Polk County, Yellow Medicine County, Litchfield area, Alexandria/Glenwood area, Fairmont area, and Metro area.

Within the newly reorganized UMES, Shoreland Revegetation was identified as a "spotlight program." This translates to additional resources and support from Extension to "fine-tune" the program in order to provide the greatest benefit to the citizens and resources of Minnesota. In addition, the Extension Shoreland Education Team was recently recognized at the Annual University of Minnesota Extension Summit, receiving the UMES Team Award and the Minnesota Community and Natural Resources Association "Natural Resources and Environment" Award for excellence in programming.

Wildrice Breeding and Germplasm Improvement

Dr. Raymie Porter, Wildrice Geneticist *raporter@umn.edu*

In September of 2002, about 14,000 pounds of seed of the newest variety 'Itasca' was released to Minnesota growers. Itasca (previously designated PBM-C6) was developed by our project from material provided by a Minnesota grower, and therefore was released by the Minnesota Cultivated Wildrice Council. In variety tests over the past several years, it has consistently yielded 20-30% more grain than the best currently available varieties. It also has been selected for fungal brown spot resistance, shattering resistance, and lodging resistance, for which it is superior to current varieties. However, its seeds are somewhat shorter in length than Franklin, but approximately equal to Petrowske Purple.

We are currently working on a very early maturing population of K2 obtained from another Minnesota grower. The population, designated K2EF-C3, is being selected for nonshattering plants that also maintain their early maturity. Through collaboration with grad student Alex Kahler in Dr. Ron Phillips' lab in St. Paul, we are using molecular genetic markers (not genetic engineering) to identify plants which lack shattering genes. Once identified, these plants will be allowed to intercross to form a new population that is initially fixed for nonshattering, as well as having the earliness we have been selecting. In variety tests this year, K2EF has yielded 1100 and 1300 lb/A (adjusted to 40% moisture), even though it was harvested as much as 15 days earlier than Petrowske Purple and Itasca.

We are continuing to select for resistance to fungal leaf diseases, and this year we have inoculated with both *Bipolaris oryzae*, causal agent of fungal brown spot disease (FBS), and *B. sorokiniana*, causal agent of spot blotch. These continue to be the two most significant diseases of wildrice. Through the work of Laura Carey in the lab, we were able to culture and inoculate around 200 liters of diluted inoculum (about a billion spores) on our research plots. If this seems like a lot of spores to apply in the field, keep in mind that these fungi are much more abundant in nature. We merely collect the fungi, grow it in the lab, then apply it directly on our plots to get more uniform coverage than nature would provide.

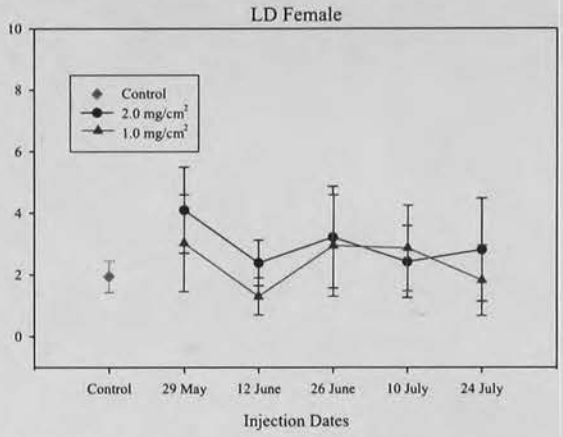
In the second year of field experiments conducted by grad student Joanna Cregan, wildrice pollen in the air was measured and seed set at various distances from a paddy was estimated. A volumetric pollen sampler was used to estimate the pollen concentration in the air adjacent to a grower's paddy, and at several distances from the paddy. Also, variations in pollen concentration were observed throughout the day (peaking at noon to 4 pm, with three smaller peaks at other times of a 24 hour day). Similarly, higher pollen concentrations were observed when temperatures were 70 to 74 °F, or relative humidity ranged from 50-60%, or when wind speed ranged from 4.5 to 5.5 miles per hour. Pollination still occurred at other temperatures, humidities, and wind speeds, but these were the peaks observed.

In an experiment using plants, which didn't produce their own pollen, but rather had to be pollinated from another source, seed set was observed at a distance as great as 2 miles from the nearest paddy, albeit at a low percentage (1 to 5%). Without using some kind of genetic marker, the actual pollen source that resulted in these seeds could not be determined, whether it was the nearest paddy, or a regional wildrice pollen cloud made up of pollen from natural and cultivated stands.

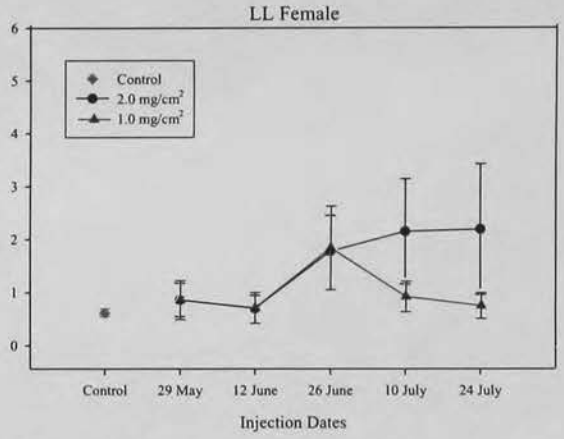
Tree Improvement

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

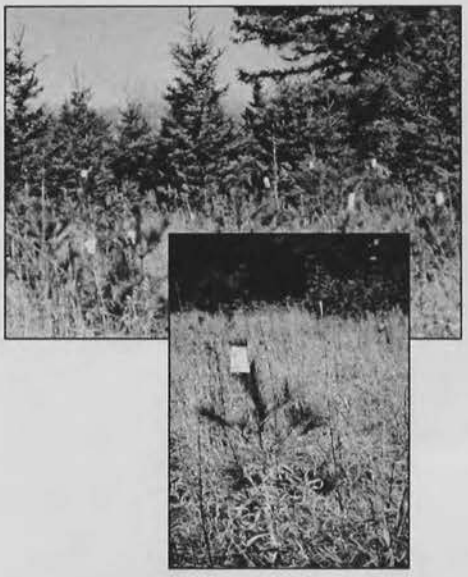
As you may recall from earlier articles one of our short-term goals in the tree improvement cooperatives is to better manage the cone production, and hence, seed production in our seed orchards. To this end, we established two cone induction trials in summer 2001 for European larch, Japanese larch and red pine using stem injections of gibberellic acid. This spring we were busy counting male and female cones. By intensely sampling a few trees selected at random, we were able to estimate the total percentage of male and female cones on European and Japanese larch and the total percentage of male and female cones and average number of female cones per branch tip on red pine. Our analysis for the larches indicates that gibberellic acid is effective in increasing the number of male and female cones over control trees but there is variation among individual trees in their response to treatment. Japanese larch was much more predictable in its response to treatment with gibberellic acid than European larch. (See figures below for a graphic representation of results for female cones.) The analysis for red pine is incomplete at this time.



Percentage of female cones (transformed) on European larch by date of injection. Bars represent the standard error of the mean.



Percentage of female cones (transformed) on Japanese larch by date of injection. Bars represent the standard error of the mean.



A "bud cap" is a piece of paper stapled around the terminal bud of a tree in the fall that protects the terminal bud from deer browsing. The "bud cap" is either removed or decomposes during subsequent growing seasons.

Silviculture

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Deer browsing is the biggest problem for field foresters in regenerating forests in Minnesota. Repeated browsing will reduce seedling vigor, the rate of height growth and in severe instances kill seedlings. The use of deer population densities as a gauge for probable regeneration success has limited utility due to temporal variations in local populations and habitat across the landscape. Deer can move to their desired food source and one family of deer can cause severe browsing damage to tree seedlings. Recent work in southern New England suggests a threshold level of 23 deer per square mile above which the regeneration of mixed-species forest was negatively impacted. Deer densities in northern Minnesota are highly variable and in the Grand Rapids are generally less then 20 deer per square mile. However, both the preferred tree species on which they feed and the deer population varies greatly. For example, white pine is heavily browsed throughout much of northern Minnesota but seemingly ignored in specific locals near Cloquet and in southwestern Itasca County.

White pine establishment is enhanced through the use of "bud capping" either naturally regenerated or planted seedlings until their terminal leader is above the reach of browsing deer. I've recently revived a white pine regeneration project initiated in 1993 that involved planting approximately 3,000 seedlings that was funded from the White Pine Foundation that was established by Jack Rajala and Dave Rabas. Amy Harder, a graduate student with the Department of Forest Resources, Tim O'Brien here at NCROC and myself have been measuring surviving white pine seedlings that were planted in thinned and unthinned red pine stands, and an unthinned white pine and white spruce stand.

Alumni News

Mr. Tom Carpenter

Another three years have passed and it's time for another all class employee reunion. The committee has started to put together a reunion for the month of July, 2003. The exact date has not been determined, therefore was not available at the printing of this North Central News. By the next addition, we will have the date set and a registration form enclosed. Have a healthy and enjoyable winter. Happy holidays and we hope to see you in July.

Upcoming Events

Beef Cow/Calf Days

Friday, February 7, 2003

6:00 - 10:00 pm

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

Retirement News

Dr. Robert Nyvall, UM/NCROC Professor and Plant Pathologist retired on July 5th. Dr. Nyvall served as NCROC Head for six years before returning to teaching and research. His research concentrated on diseases of wildrice and the development of mycoherbicides or fungi used to control weeds. Bob is the author of a book called "Field Crop Diseases" and has authored and co-authored many research and extension papers. We will all miss Bob and his wife Sandra, and wish them well in their future life with grandchildren, garden, travel, etc. I hope they will continue to consider NCROC their home.

Employment Anniversaries

pictured left to right: Dan Swenson, Ray Steffen, and Howard Hoganson

Several NCROC employees reached important employment anniversary dates in 2002. Congratulations to the following NCROC employees for their years of service to NCROC and the University of Minnesota: Dan Swenson (Building and Grounds) 15 years in March; Howard Hoganson (Associate Professor, Forest Resources) 15 years in August; and Ray Steffen (Farm Animal Attendant) 30 years in December.

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