



# NORTH CENTRAL NEWS

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## The New University of Minnesota Extension Service

by David L. Rabas

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Increasing budget deficits and a continuing decrease in federal funding have resulted in a need for major staffing changes in the University of Minnesota Extension Service. The restructured staffing model is part of a three-year strategic plan to address financial shortfalls while continuing to serve the extension and outreach needs of Minnesota's community and agricultural interests.

According to newly appointed Extension Service Dean, Dr. Charles Casey, "The goal of the new model is to retain Extension staff in every county of the state. The model aligns staff expertise with the local needs of communities to insure that Extension staff address the critical needs of Minnesotans by connecting the research of the University with real life issues".

The new staffing model has resulted in a reduction in collegiate (statewide), county, and administrative staff as well as operational budgets for travel, etc. About 160 of the remaining county staff will specialize in one of five key areas: 4-H and youth development; agriculture; food and environment; family development; natural resources and the environment; and community vitality. About 40 educators will serve as Extension Directors with responsibility for providing administrative services to two or three counties.

This new structure and staffing reductions have caused some concern in counties and at state legislative levels. Citizens, county commissioners, and state legislators are concerned that the new model will result in reduced services and less local input into extension programming and other services. While these concerns need to be recognized, I think they are adequately addressed in the new model.



The University of Minnesota Extension Service Itasca County is located in the North Central Research and Outreach Center Administrative Building.

The restructuring of the Minnesota Extension Service addresses some critical issues affecting the delivery of quality information to Minnesota residents. One issue is the level of expertise of many staff. The need to serve multiple needs and to respond to issues that include numerous disciplines has severely limited the opportunity for county Extension Educators to specialize and achieve the level of expertise required to deliver services and technology to their most progressive and innovative customers. This need for specialization is clearly demonstrated in the level of expertise required to provide up to date information and services to high technology users such as dairy, swine, and crop producers, but also impacts the quality of services and level of technology available to address youth, family, and environmental issues. In the new model, well trained county staff who have developed expertise through the opportunity to specialize, will be available to provide the level of technology and expertise required to more fully address the needs of county residents.

Another issue addressed by the new model is the increasing demands on educator time for personnel management and administrative issues. In the past model, one of the county extension educators also served as the person responsible to administrative

services. Dealing with personnel issues, budgets, county boards and extension committees, and other administrative responsibilities left increasingly less time for programmatic responsibilities of the educator who assumed these local administrative responsibilities. The new model provides for full time multi-county administrative personnel who don't have to sacrifice programmatic responsibilities to provide administrative services. While county boards and extension committees will need to adapt to working with multi-county administrative staff, the new structure should provide improved county/extension communication and enhanced quality of both administrative and programmatic services.

A third issue that is addressed by the new model from both an expertise and programmatic delivery base was also addressed by Dr. Casey in his comments regarding the merits of the new model. Dr. Casey said, "We must ensure that our programming addresses the most critical issues in Minnesota and ties directly to the research base of the University." Freeing up resources to provide the flexibility to respond efficiently and effectively to critical needs and using the research base of the University to provide the most current information to address those needs is consistent with the philosophy of the Land Grant University/Extension Service partnership.

I would urge extension customers and government leaders who read this article to give the new extension model time to evolve. In the end, we should find ourselves with an Extension Service which more efficiently and effectively delivers the highest quality of services to our customers and Extension Educators who are highly qualified to deliver the level of technology their customers need to live and succeed in the 21<sup>st</sup> century.

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](mailto:drabas@umn.edu)

### University of Minnesota North Central Research and Outreach Center Advisory Committee - December 2001



Pictured from left to right: Troy Salzer, John Gunvalson, George Scherzer, Willy Lindquist, Debbie Clark, Dave Rabas, Margaret Haapoja, Otto Lee, Teresa DeVries, Jim Marshall, and Bill Schnell. Not pictured: Jerry Briese, Jeff Patnode, Bob Olen, Tom Crow, Steve Ludwig and Tom O'Hare.

After leaving some doubt that it would ever arrive, spring has finally reached Northern Minnesota. After entering the fall with dryer than "normal" conditions, this winter's lack of precipitation could create problems with spring planting and pasture growth unless April and May rainfall is above average. Planning now for dry conditions could help reduce the effects of a drought should spring precipitation not be adequate.

The North Central Research and Outreach Center Advisory Committee met at NCROC on December 4, 2001. New members Otto Lee, Baudette; Debbie Clark, Grand Rapids, Teresa DeVries, Grand Rapids; Tom Crow, USDA Forest Service; Steve Ludwig, Chippewa National Forest; and Bill Schnell, DNR were elected to three-year terms on the Committee. Allen Jackson was recognized for his service on the committee. Allen, whose term expired in 2001, served several years as Advisory

Committee Chair. Troy Salzer, Carlton County Extension, was elected Advisory Committee Chair and Otto Lee was elected Vice Chair.

Welcome to new Advisory Committee members and thank you to Allen Jackson and all committee members for helping make our Research and Outreach Center more responsive to the needs of our customers. A special thank you to those members who were able to help support our legislative funding and bonding requests.

As I write this article, the prospects for receiving bonding funding from the legislature for replacement of our outdated, energy and work inefficient shop do not look good. We will continue to attempt to secure funding for this important facility. The farm shop/ carpentry building provides research support for eleven NCROC based scientists. Machinery and equipment maintenance and repair, research equipment design, modification and construction services provided by staff that work in this facility are essential to the success of our research mission.

We (CNR and NCROC) appear to have been successful in securing bonding funds for construction of an addition to the Aspen/Larch office/laboratory building as well as two parcels of land to enhance tree improvement work by providing different soil types and other environmental factors to evaluate genetically improved trees.

The year 2002 marks the beginning of a fund campaign to provide additional resources for beef research. The Beef Research and Investment Fund Campaign has a goal of raising \$300,000 to support ongoing and future beef research and to develop investment opportunities/strategies to provide long-term permanent funding for beef research at NCROC.

The NCROC beef herd is the University's only beef cow/calf research herd. Contributors to the Beef Research and Investment Fund will help create the next generation of beef genetics and improve the sustainability of the beef cattle industry by supporting ongoing research and education programs in reproductive technologies and beef herd management.

State support for applied research has continued to decline. Support from the beef industry and NCROC friends are very much needed to continue this important work. Please consider a contribution to the Beef Research and Investment Fund. Donations can be sent to the North Central Research Fund at 1861 E Hwy 169, Grand Rapids, MN 55744.

I look forward to visiting with many of our NCROC friends and alumni this summer. Please stop by and visit at any time. Visitors are especially invited to take part in our summer field days and walk along our nature trail, which takes visitors through unique old growth timber and black spruce bog ecosystems.



Allen Jackson (right), past president of NCROC Advisory Committee, receiving a recognition plaque

## Agricultural Engineering

Dr. James J. Boedicker, Agricultural Engineer - [jboedick@umn.edu](mailto:jboedick@umn.edu)



One of the traditional roles of the Agricultural Engineer at NCROC is to assist with maintenance and improvement of facilities, equipment, and land in support of the center's

research and outreach programs. Other articles in this and past issues of the North Central News provide evidence of the variety and magnitude of programs based at this Center. Each of these programs requires a set of facility, equipment, and, in most cases, land resources that must be continually maintained, modified and/or improved to effectively fulfill the needs of the program. Undergirding all of this is a basic infrastructure of utilities and roads that must also be continually maintained and improved as required.

Providing for the physical plant and equipment

related needs at this Center is a sizable and multifaceted task. Factors that complicate the process are the advanced age of some of our equipment and facilities and the fact that operations are now divided between the main center east of Grand Rapids and the Beef and Forage Research Farm some four miles south. Another is a limited supply of time and dollars. Much of the hands-on maintenance and improvement work at this Center falls to our small but highly capable maintenance staff consisting mainly of Doug Hendrickson, mechanic, and Tom Carey, carpenter. Outside contractors are utilized as well as situations dictate. Large projects involve working with architecture and design firms, U of M officials, utility providers, contractors, and others to help define program needs, determine how to fulfill them within the available funding, and facilitate the process as the project moves from budding through to completion.

Presently, we are working toward completing a long list of small and medium sized facility and equipment projects. Two of the larger ones are

wiring of a new wildrice research plot building and demolition of an old (1920's) cattle loafing barn, built originally for solid manure storage. At the same time, we are working with our electrical energy supplier on proposals for replacing the U of M owned electrical substation across Hwy 169 from the main Center campus. Built in 1949, this substation serves as our principal source of electrical power. This replacement work would likely occur in conjunction with the installation of a high voltage line to serve a new building presently under construction at Itasca Community College located on the NCROC campus. Finally, as of this writing, we are hoping the Minnesota legislature will approve bonding for two projects for this Center that are included in the current overall U of M legislative bonding request. These are an addition to the Aspen/Larch research building and a new shop building to replace the current shop, built in 1931. Either of these much-needed facilities, if approved, will entail considerable input on our part during all phases of planning, design, and construction process.

## Agronomy

Mr. Russell D. Mathison, Agronomist - [mathison@umn.edu](mailto:mathison@umn.edu)



Improving pasture productivity is a major focus of the forage research

efforts at NCROC. The cost of feeding a mature cow on pasture is typically one-third the cost of feeding stored forage. An important component of improving pasture productivity is low-cost, yet effective renovation to introduce desirable species, such as legumes. A research study planned at NCROC this summer will investigate the feasibility of interseeding kura, alsike, and red clovers into existing native grass pasture (primarily Kentucky bluegrass and quackgrass) using a grain drill. In addition to these species treatments, suppression and kill rates of glyphosate and paraquat to control competition from the grass will be compared to a no herbicide control. Another important component of this

study will be a seed inoculation technique using a "sticker mix" rather than the traditional granular type or coated seed. There is some speculation that current inoculation methods do not provide an adequate supply of rhizobium. Rhizobiums are microbes that form a symbiotic relationship with legume plants, living on the plant's roots and fixing atmospheric nitrogen, which can be used for plant growth. Inadequate nitrogen fixation, especially during the establishment year, could affect stand productivity and long-term persistence. In the case of ladino and red clover, there are likely sufficient rhizobia in our soil already because they have been commonly grown in much of northeast Minnesota, however it is unlikely that the rhizobium associated with an uncommon species like kura clover is already present in our soil.

Another pasture productivity improvement study to be established in 2002 is a kura clover variety trial. Legumes plants would likely improve pasture productivity because they would supply forage during the warmer summer months when cool season grasses are less productive, such as mid-summer. However, perennial legumes traditionally grown in the north central US, such as alfalfa, birdsfoot, and red clover are productive for only a few years. Kura clover is a perennial legume with demonstrated long-term persistence under grazing, but has been difficult to establish. Plant breeders have been developing varieties with improved establishment traits. Several of these improved varieties will be compared to earlier varieties and red clover for ease of establishment, forage yield, and persistence.

## Animal Science

*Dr. G. Cliff Lamb, Animal Scientist - [clamb@umn.edu](mailto:clamb@umn.edu)*



Greetings! It seems like just a few weeks ago that I was discussing calving during last years calving season. In contrast to last year, we experienced a fairly mild winter, but were hit with a blast of cold air as

soon as the first calves started to hit the ground! Only now is it starting to warm up and the calves are beginning to show their enthusiasm for life. We are halfway done with calving and it seems like we have an excellent group of calves again. However, I would be remiss to fail to mention the excellent job our beef crew does especially during calving. In spite of some long days and short nights, our crew maintains a great attitude.

As I mentioned a year ago, we have reached a capacity for cattle numbers and have taken the approach of culling any cows that are inferior both from a structural standpoint, but just as importantly, from a performance standpoint. To stay at a capacity of approximately 200 cows we are calving about 170 cows. In addition, we have 24 donor females which we collected embryos from during the fall and winter for experiments during the summer. There also are 17 yearling bulls that we are developing for sale to cattle producers along with a few two-year-old bulls and 75 replacement heifers that look super. Our philosophy on cattle production is predominantly based on performance. As I

mentioned, we cull those females that do not perform, but we also select bulls that produce cattle with excellent growth and carcass potential. Our sale bulls are the top 20% of our bull calves based on performance and structural soundness. The remainder are castrated and fed as fat steers. I firmly believe that not all bull calves make good herd sires; therefore, our castration rate is 80% to ensure that only our best bulls become herd sires!

We continue to see an increase in attendees at our field days. In July last year, we had a Beef Stockman's Tour, which involved cattlemen from the northwest part of Minnesota and was a great success. As usual, Beef/Forage Day provided cattlemen in our area with some interesting cattle production options and we increased attendance by more than 30 people. Please mark your calendars to attend Beef/Forage Day on August 29, 2002. For those of you who attended Cow/Calf Days in Grand Rapids you will agree that we may be outgrowing our facilities. We had to cram more than 80 people into our multi-media room for the excellent presentations.

Being the primary beef research station for the University of Minnesota, we have a diverse research program from general cattle and pasture management to a more focused area of applied reproduction. In two separate experiments, we initiated an opportunity to induce twins in females with some success. In one experiment, we flushed embryos out of donor cows, split the embryos in half and transferred both half (demi)

embryos into a recipient (surrogate) cow. Initially we had 47 fetuses in 30 recipients from 37 transfers. Although we had some embryonic loss before day 70 of gestation, we had limited calving difficulty and a 90% live calf rate. In a second experiment, we time artificially inseminated cows on the first day of the breeding season, followed by an embryo transfer of a frozen embryo seven days later. Although the twins are unrelated, we have the ability to increase calving rates and subsequently overall weaning weights per cow. In this study, we managed to induce nine sets of twins from 28 pregnancies (32%). Again, we had no calving difficulties, but one set of calves was stillborn. Nonetheless, the remainder of the calves seem to be doing well. Our other research focuses are on estrous synchronization and timed artificial insemination, and we will not neglect pasture management and performance in our research program.

In our November issue of the North Central News, you were introduced to our Beef Research Fund Campaign. We have formed a committee and the committee has been working on a strategy for acquiring funds for beef cattle research and promotion. Don't be surprised to be reintroduced to this campaign in the form of a newsletter or flyer in the near future.

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 on a personal visit at your leisure. Visitors are always welcome.

## Forest Management

*Dr. Howard Hoganson, Forester - [hogan001@umn.edu](mailto:hogan001@umn.edu)*



Analyses for the ongoing USDA Forest Service planning process continues to dominate the time of Howard Hoganson and his graduate students. NCROC has served as a central meeting place

for the interdisciplinary planning team for the Minnesota National Forests (the Chippewa National Forest headquartered out of Cass Lake

and the Superior National Forest headquartered out of Duluth). Graduate students Wei Yu, Eric Henderson, and Josh Bixby spent the summer in Grand Rapids helping with analyses. Josh remains in Grand Rapids for the fall semester. Mitch DeJong, a new forestry graduate student, joins the team in January. Emphasis in the planning process is on better integrating environmental social and economic objectives. Two forest management-scheduling models developed at NCROC are central to the analyses. Key issues will likely be how much old forest and how might it best be sustained on the landscape over time. Plans for each of Minnesota's

National Forest were last completed in 1986. The Itasca Forest Resources Network, a broad-based local community group, recognizes the importance of the Chippewa National Forest to local Itasca County communities and is monitoring the planning process. Draft plans describing a range of alternatives for each National Forest are scheduled to be released for public comment in late spring. Updates on the planning process can be found on the web at <http://www.fs.fed.us/r9/chippewa> and <http://www.superionationalforest.org>

## Horticulture

*Dr. David K. Wildung, Horticulturist - [dwildung@umn.edu](mailto:dwildung@umn.edu)*



This time of year, it is always exciting to visit garden centers and nurseries to see what's new for the garden. My crew and I get to carry that process further as we plan and prepare for the new growing season. We currently are planting the seed, transplanting the plugs, and propagating the chrysanthemums, strawberries and blueberries that will be used in our research plots this summer. In addition, we are also planning the research plots for what promises to be a busy exciting season.

During the 2002 season, we will be evaluating hi-tunnels for vegetable crop production to speed maturity and increase production. Hi-tunnels are like a small greenhouse without heat or ventilation. They have been used in cooler growing climates like ours in Europe and in the NE United States. If successful, they would allow vegetable producers an opportunity to obtain earlier production and a longer production season with more yields. Hi-tunnels have been used successfully with warm season crops like tomatoes, peppers, and the vine crops. This season we will be comparing hi-tunnel production to conventional growing systems.

We will also plant a Chinese cabbage variety trial to evaluate better how to grow the crop. The planting will also be used to identify varieties that may have tolerance to bacterial soft rot, a disease that was very bad during the 2001 growing season. Chinese cabbage is the crop designated to study nutraceuticals and how the levels of these positive chemicals change as the crop grows and matures. During the 2001 growing season, less than half the plants matured and mortality from bacterial soft rot was over 25%. Hopefully a variety can be identified that will be more dependable.

In 2001, the first shrub chrysanthemum, 'My Favorite Red', was introduced along with 'Centerpiece Bronze' and 'Sesquicentennial Sun'. Several additional selections may be introduced in 2002 and the chrysanthemum planting will have several exciting new entries. 'Purple Wave' petunia was introduced in 1995 as a revolutionary low growing trailing petunia suitable for hanging baskets. Since that time more colors of 'Waves', double 'Waves', and 'Tidal Waves' have been introduced. In 2002, a 'Blue Wave' is being trialed for the first time. In addition to petunias, whole new groups of plants for hanging baskets have been developed. Such things as bacopas, diacias, thunbergi, trailing verbenas, and others make excellent hanging baskets. Our 2002 trials will have outstanding new cultivars and should be an excellent place

for you to see how these new types perform in north central Minnesota. There are also several new excellent bedding plants in the new trials such as butterfly weed, double impatiens, the All America selections, and many others.

Small fruit evaluations have progressed very well during the last two years. Several strawberry breeding lines are in the advanced stages of testing with two being sent out for testing this year in Iowa, Michigan, Wisconsin, Pennsylvania, and New York. About thirty older blueberry breeding selections were dug and discarded in 2001 and about 40 new selections will be planted this spring. In addition, funding for one more year was secured to continue the strawberry burn renovation study where we are evaluating tractor speed-burner pressure and their effects on fruit production. The organic blueberry production project at the Staples Ag Center will also continue for one more season. We will also be starting two new studies in 2002: (1) determining if bacterial angular leaf spot is of economic importance to strawberry producers in Minnesota and (2) determining the optimum density to prune Minnesota blueberries for maximum production. These projects will all be funded from USDA specialty dollars given to the Minnesota Fruit and Vegetable Growers Association.

## Shoreland Vegetation and Landscape

*Ms. Mary Blickenderfer, Extension Educator - [blick002@umn.edu](mailto:blick002@umn.edu)*



The shoreland programs offered through the University of Minnesota Extension Service and Water Resources Center continue to expand in regional coverage and educational opportunities. The Shoreland Landscaping Workshop Series, offered in Aitkin/Mille Lacs, Cass/Crow Wing, Lake/St. Louis, Hubbard, and Sherburne Counties in 2001, will be presented in Polk, LeSueur, Washington/Ramsey, Beltrami,

and Wadena Counties in 2002. To accommodate the potential increased demand for shoreland plants in the northern counties, three new growers in Polk and Itasca Counties will be producing native plants for shoreland projects. Also, in response to the demand by workshop participants, additional workshops covering algae, aquatic plant identification, upland plant identification, and shoreland project maintenance and monitoring have been developed and will be offered for the first time this year.

Shoreland Extension Educators continue to partner with the Minnesota Department of Natural Resources, the Central Initiative Foundation, Minnesota Lakes Association, local units of government, and organizations to deliver shoreland and water quality educational programs for the nursery/landscape and contractor industries, forest managers, Master Gardeners, county officials, natural resource professionals, lake association leaders, and shoreland property owners.

## Silviculture

*Dr. Daniel W. Gilmore, Silviculturist - [gilmo009@umn.edu](mailto:gilmo009@umn.edu)*



During the past 2 years, we have established a number of thinning trials on the NCROC forest. In this edition of the North Central News, we are providing a pictorial display of thinning operations in a balsam fir and a Norway spruce plantation located in the northwest corner of NCROC.



An unthinned 30-yr-old balsam fir stand that illustrates no management activity.



A portion of the same stand in Fig. 1, thinned from below where all trees 6 inches in diameter and smaller were removed.



A portion of the same stand in Fig. 1, being converted to an uneven-aged stand. Note the wide spacing to encourage natural regeneration.



A 40-yr-old Norway spruce plantation where a crop tree release was prescribed to maximize tree growth. Thinning efforts focused on releasing the tree crowns on all sides.

## Tree Improvement

Dr. Andrew David, Forest Geneticist - [david046@umn.edu](mailto:david046@umn.edu)



Spring is busting out all over! Well, in the greenhouse anyway. In late winter, the greenhouse is one of my favorite places because it is sunny, warm and there are many green plants poking their heads out of moist soil,

yearning to become part of a new genetics trial. A trip to the greenhouse is a wonderful way of beating the winter blues.

An active greenhouse is also a harbinger of spring and breeding season. From a previous column, you may recall the induced flowering projects in European larch, Japanese larch, and red pine. (Botanists will remind me that technically the gymnosperms do not have flowers, but rather

pollen and ovulate cones.) Between the Aspen/Larch Genetics Cooperative and the Minnesota Tree Improvement Cooperative, there are breeding programs for seven species. Moreover, many of our cooperators have seed orchards where large quantities of improved seed are produced for reforestation efforts. Because of these two factors, there is a tremendous need to control flowering to better manage time and resources. Last year we applied a non-toxic chemical called gibberellic acid<sub>4,7</sub> (GA<sub>4,7</sub>) to the trees and this spring we will count flower buds on the trees in the trials. There are 252 trees in the European and Japanese larch trial and over 750 red pine on two different sites in the other flower induction trial. Results from these trials will provide us with information regarding the best time of the growing season to apply GA<sub>4,7</sub> and the proper amount of GA<sub>4,7</sub> to apply to control flowering.

The other half of spring is planting new trials and this spring we will be putting in two hybrid aspen trials. The first trial explores differences in seedling root to shoot ratio and its impact on early growth and survival. This trial will evaluate three different stock types, our standard one-year-old bare root seedling, a two-year-old bareroot seedling, and a two-year-old bareroot seedling that has had its stem removed but the roots largely intact. The second hybrid aspen planting trial involves a deployment strategy we call 'dense packs'. These are small plantings of 30-100 seedlings at a high density of roughly one per square foot. Dense packs are designed to mimic natural sucker regeneration and avoid problems with browsing in areas of high deer concentrations. This trial will be done in conjunction with Blandin Paper Company on two different sites using three different seedlings numbers per dense pack at two different densities.

## Wildrice Breeding and Germplasm Improvement

Dr. Raymie Porter, Wildrice Geneticist - [raporter@umn.edu](mailto:raporter@umn.edu)



Seed size continues to be an important aspect of wildrice breeding research, due to concerns that Minnesota cultivated wildrice not become too short. Seeds from variety trials were measured in 2001,

using the same methodology reported in 2000. These methods involved scanning hulled seed and using Winseedle<sup>®</sup> software (Regent Instruments, Inc., Quebec, Canada) to measure the scanned images. Full results are reported in the 2001 edition of Minnesota Cultivated Wild Rice Research. To summarize, seed length measurements showed significant differences among varieties, distinguishing differences as small as 0.7/64 inch. However, seed length was shorter overall in 2001 than in 2000, by about 1/64 inch. Eight of twenty variety trial entries fell below 85% long-grain within the A width grade (long grain is considered anything above 20/64 inch). Only three entries fell below that level in 2000.

In 2001, we also measured samples of seed from growers fields, which were sent to the Gourmet House processing plant in Clearbrook, MN. This

gave us some idea of what seed length growers were getting and processors were processing. For Franklin, Minnesota growers' samples ranged from 21.3 to 21.9/64 inch, slightly shorter than the variety trial average of 22.5/64" in 2001. Samples of Franklin from California were considerably longer 27.5/64". Surprisingly, Petrowske Purple, the most recent variety released from Minnesota Agricultural Experiment Station, was longer in growers' samples (22.8 to 23.2/64") than Petrowske Purple in variety trials (21.5/64"), and longer than Franklin in growers' fields. These results indicate some genotype by environment interactions, but possible causes are only speculation at this point.

Although seed size differed somewhat from one environment to the next, the variety trials provided an opportunity to measure heritability in the broad sense (i.e., genetic differences among varieties as a percentage of total differences). Seed length was 80% heritable in 2001, and 86% in 2000. Percent of long-grain in A-grade was 70% heritable in 2001, and 84% in 2000. This is good evidence that seed size can be improved by breeding, although such "broad-sense heritability" includes some genetic variability that is not responsive to recurrent selection. The next step is to measure "narrow-sense heritability" using differences among defined families. This kind of heritability uses only

additive genetic variance, which is directly responsive to selection. Predicted gain from each generation of selection can then be estimated, allowing the breeder to know what to expect from selection efforts to increase seed length. We are also planning other experiments to look at possible agronomic influences on seed size (e.g., initial nitrogen rate, water depth, planting date, etc.)

In 2002, we (in a collaborative effort with Dr. Ron Phillips and grad student Alex Kahler) will also begin using molecular markers to screen for the major shattering gene in a potential variety, K2EF-C2. This variety is a good candidate for marker-assisted selection using RFLP markers, since it still has a significant percentage of shattering-type plants, even after 2 cycles of selection. This use of molecular genetic tools is *not* genetic engineering, since we are not bringing in any foreign DNA into wildrice. We are merely using known relationships of the DNA of wildrice to select more effectively for a trait that already exists in wildrice.

Also planned for 2002: experiments conducted by Joanna Cregan, grad student of Dr. David Biesboer, to understand the effective distance that wildrice pollen travels to pollinate other wildrice plants.

## Upcoming Events

### Wild Rice Field Day

Thursday, July 18, 2002 (Tentative)

9:00am - Noon

Location: North Central Research and Outreach Center

### Horticulture Day

Wednesday, August 28, 2002

2:00pm - 6:00pm

Location: North Central Research and Outreach Center

### Beef Forage Day

Thursday, August 29, 2002

10:00am - Noon

Location: 4 miles south from Grand Rapids on Hwy 169, then ¼ mile east on the Harris Town Road

### Grand Rapids Garden

#### Club Tour

Tuesday, September 3, 2002

6 pm-8 pm

Location: North Central Research and Outreach Center



Aerial view of North Central Research & Outreach Center Campus

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