

MINNESOTA *Science*

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In Forest Poll, a Picture's Worth a Thousand Words

So many public opinion surveys are overwhelming either in length or sense. Yet, finding out what people feel is critical before making land use decisions that will affect them.

Forest researchers Timothy Knopp and Elaine Caldbeck devised a simple survey to provide citizen input for those who plan the use of public forests. To avoid taxing the patience of their respondents, they used pictures—five simple drawings—that illustrated the “hard to visualize” options for state forest land use. The University’s Agricultural Experiment Station and Department of Forest Resources together with the Minnesota Department of Natural Resources (DNR) Division of Forestry supported the research.

The 200 Minnesotans surveyed chose how they would use three million acres of public-owned land in 55 Minnesota state forests. Participants were selected at random from four counties—Hubbard and St. Louis in northern Minnesota, and Redwood and Mower in southern Minnesota—and the seven county metro region. Each participant received 100 Natural Resource Units (NRUs), a sort of land-unit “playing



Minnesota forests mean different things to different people. Researchers look for better ways to get citizen input into forest land use decisions.

- 2 Patents Offer More Prestige Than Money
- 3 New Alfalfa Means More Nitrogen for Next Year's Crop
- 4 Is There a Future for Angora Goats in Minnesota?

chip” they could allocate among the five choices, lettered A through E. Up to three explanatory lines were included with each choice. Purposely avoided were any catch phrases such as “wilderness” or “multiple-use” that could be emotional or politicizing.

The results were tallied and mailed to the respondents, who were then offered a chance to change their mind based on the first results, or stick with their original choices. “The second vote really didn’t change the sense of the first,” Knopp says.

This decisionmaking process is an alternative to a more commonly used process that Knopp calls the “black box” decision process. In this system, input is received, then one person or authority group makes tradeoffs and a final decision. The problem with that, he says, is it is difficult to know how much input from the public actually figures in the final decision.

And what did the 200 ordinary citizens choose? Surprisingly, they chose

Forest *continued on p. 2*

Patents Offer More Prestige Than Money

Several years ago, experiment station plant physiologist Albert (Bud) Markhart found himself in need of a way to extract the juices from leaves without changing certain physiological characteristics. After searching in vain for a piece of lab equipment that would do the trick, he did what any enterprising young scientist might—he invented one.

And then he went one step further. Figuring that other researchers could benefit from his new device, Markhart decided to patent the tool and contract with a private company to produce it commercially. Today, the Markhart Tissue Press has simplified research procedures for many colleagues undertaking related research.

Markhart, an associate professor in the Department of Horticultural Science and Landscape Architecture, is just one of a growing number of experiment station scientists to pursue a patent when some aspect of their research shows particular promise or ingenuity. A red maple tree, a device that tests the strength of wood products and a health maintenance computer program for pigs are among the dozen or so such research products that have been patented or are under consideration for a patent—a 17-year grant by the government of the right to exclude others from making, using or selling the invention.

This roster is likely to increase substantially in the future, says University Office of Patents and Licensing director John Thuente, who attributes the trend to “a growing awareness on the



The Markhart Tissue Press is one example of a patented product resulting from station research.

ample, a readily-apparent combination of two already-patented things). Potential royalties are certainly one reason inventors decide to seek a patent. But the incentive for many is simply the reputation it brings for themselves and the University, or the enhanced opportunity to use the discovery to benefit others.

“This particular gadget is not going to make me rich,” Markhart says. “But more important than the money involved is the prestige, for myself and my department. Patenting something is one of the best recognitions there is.”

Although the idea for patenting an invention often originates with the researcher, experiment station administrators may spot likely candidates when reviewing project proposals and

with the University patents office. “It’s very important to catch the potential for the patent early in the game,” says Betsinger, “because if the nature of the patentable thing is revealed before application is made to the U.S. Patent and Trademark Office, the potential patent-holder may lose some foreign market rights.”

“It’s very important to catch the potential for the patent early in the game.”

Young Farmers Are Being Forced Out

Young, well-educated farmers who may use new technologies are most likely to be forced out of farming. These farmers bear heavier debt loads and are especially vulnerable to economic conditions outside of agriculture. So says experiment station agricultural economist C. Ford Runge, who has been studying technology and financial adjustments in American agriculture. Monetary, fiscal and exchange rate policies have been the main cause of farm bankruptcies. Many farmers incurred large debts based on forecasts of continued increases in land values. These forecasts were wrong, Runge says. “Beginning in the early 1980s, major devaluations in farm assets and increases in real interest rates created extreme financial pressures for farmers who went heavily into debt to purchase these assets. Many of these farmers are young, well-educated and use advanced technology.”

“If current trends continue, some producers who survive may be less indebted, but less technologically efficient than some who quit. If this pattern is widespread, it may contribute to declines in the global competitiveness of American farms,” he says.

Average farm size is not likely to increase substantially—at least in the short run, Runge believes. “Without renewed strength in commodity prices, financial rewards to farm expansion are likely to remain small. Instead, land will be retired from production through government acreage and conservation set-aside programs,” he says.

—Jack Sperbeck

Forest continued from p. 1

option B—a model closer to the European style of forestry management and

research has commercial potential."

According to Thuente, just about anything—a machine, a process, a chemical, even a living organism—can be patented, as long as it is novel and not an "obvious" development (for ex-

protect the researcher's rights. When it appears that some aspect of ongoing research has commercial potential, experiment station assistant director Signe Betsinger helps the scientists "start the ball rolling" by making initial contacts

made, Office of Patents and Licensing staff confer with the inventor and review documents to determine whether pursuing a patent is likely to be worthwhile.

Patents continued on back page

St. Paul Station Marks a Quarter Century of Tracking Weather

Every day of the year, through sleet or storm or snow or rain, a scientist or a student goes to the weather station on the St. Paul campus to take measurements. Over 25 years that ritual has built up an important, continuous record of our weather and environment. That information is used for agricultural research, as well as tapped to answer immediate practical questions like: when should I plant this corn variety? What construction details should I put into my home to resist frost damage? What's the potential for flooding this spring?

The weather station rises up in the midst of agronomy plots, and its instrumentation is the "crop" of soil scientist Donald Baker. He has, over the 25 years, invented, purchased, or modified this equipment to measure fluctuations in sun, moisture, wind and soil temperature. He explains how, in the beginning, he talked the head of the agronomy department into loaning him some space in the fields, and then "the thing just grew like Topsy. Now we've done so much to the plot, sinking things here and there and digging holes and putting wires all around underground, that I think we've probably ruined it for any other use."

When Baker began the station there was little interest in the impact of climate on agriculture. But after World War II when scientists such as Baker with climatological backgrounds came

back to the universities, there was a rebirth of weather research.

The first measurements were of soil and air temperature—"the easiest thing to measure, and very important to establish planting dates," Baker recalls. "Measuring solar radiation and other climatological elements had to wait until we could get the money to buy the instrumentation." Solar radiation was added in 1963, reflected and diffuse solar radiation measurements in 1969, and longwave radiation in 1979.

Now the researchers measure soil temperature down to 42 feet, to make sure they get beneath the depth of soil affected by the annual heat wave. They also measure atmospheric humidity; evaporation and evapotranspiration; soil moisture under sod, bare soil and crops; precipitation; wind direction and wind speed; and the depth, density and temperature of soil.

"...The thing just grew like Topsy."

There recently has been an increasing interest in the impact of winter on the next season's crop. "We're trying to develop a model to indicate how deep the frost will go and how long it will last," Baker says. Two bare plots are



Donald Baker checks a pyrheliometer, which measures direct beam solar radiation, at the weather station.

used to determine the insulating value of snow. On one of the plots the snow is allowed to fall and accumulate naturally. On the other plot the snow is shoveled off.

Since agricultural crops depend so much on the moisture stored in the soil, those measurements are very important. Baker's research has shown that, on the average, no more than 15 percent of winter precipitation gets into the soil.

Helping to measure how much water is lost in evapotranspiration (water lost by both crop surface and soil surface) is a weighing lysimeter, an underground tank full of soil. It sits on a scale, so changes in weight can be used to calculate water absorption and evapotranspiration. It is also used in

Weather continued on p. 3

not typically considered in the United States. In this model, the forest is managed for maximum quality wood production, logging is done on only five percent or less of an area each year, and only nonmotorized recreation is allowed, although licensed vehicles are allowed on township, county and state roads.

"That choice is especially significant in that it reveals the potential to provide large areas for nonmotorized recreation without sacrificing timber production capacity," Knopp says.

Choices A and E called for motorized use exclusively, choice C for multiple use (the way most of the state forest lands are managed today) and choice D could be called the "wilderness" choice. (In a sample poll of DNR foresters and Sierra Club members, just for comparison, the two groups predictably allocated the most NRUs to C and D, respectively.)

In follow-up questioning, 78 percent of the 200 were pleased with the process and 68 percent were pleased with the results. That revealed something encouraging about people's willingness to accept public decisions, even if they don't agree with that decision. "The selection process was something like an election in a democracy," Knopp says. "If the participants believe the process is fair, even if the outcome isn't what they'd prefer, there is more likelihood of acceptance."

Knopp and Caldbeck believe the public needs to be given an understandable group of choices in straightforward language as the basis for any decisions. The public also ought to know how their responses will affect the final decision.

Knopp and Caldbeck kept their promise to send the results of the allocation process to the participants. Next, Knopp is considering a polling device based on a catalog—something most people love to flip through.

—Mary Kay O'Hearn

IN PRINT

Farmers looking for alternatives to low grain prices should consider marketing their grain through dairy steers, according to animal scientist Richard Goodrich, contributing author to *Studies of Dairy Beef Production* (AD-SB-2896), a new experiment station publication.

Minnesota has a large underutilized resource in dairy steers, says Goodrich. "Many farmers now send their steers to neighboring states for finishing instead of feeding them on farm to market weight. That trend started when grain prices hit record highs during the 1970s, which raised the cost of finishing steers and the marketing value of grain. The value added in finishing steers could be a timely new source of income."

The publication offers information for anyone interested in dairy beef production. It examines nutrition programs for feeding Holstein steers to finishing weight. Included is information on carcass quality of Holstein beef.

Minnesota farmers and seed producers are probably better acquainted with *Varietal Trials of Farm Crops* (AD-MR-1953) than any other experiment station publication.

The publication is revised yearly, and the 1987 edition is now available. It contains the University of Minnesota's latest varietal recommendations for forage, grain, oilseed and pulse crops commonly grown in the state as well as summaries of performance data on specific varieties, based on trials throughout the state. Another useful feature is a planting rate and date recommendation table, also based on station research



Nitro is a single year forage which has been selected for larger roots and increased concentration of nitrogen in the roots.

New Alfalfa Means More Nitrogen for Next Year's Crop

These days shrewd farmers, faced with low commodity prices, are re-evaluating their management practices as they look for ways to widen cost-profit margins. Many such farmers will be interested in Nitro, a new alfalfa developed at the University of Minnesota by scientists with the U.S. Department of

nitrogen fertilizer.

In trials at Becker, Lamberton, Rosemount and Waseca, Nitro planted in late April or early May produced an average total hay yield of 3.4 tons per acre, with high yields of about 5.0 tons per acre for both Nitro and dormant check cultivars. When all cultivars were

ment and cutting management practices affect forage yield and quality and residual nitrogen. Craig Sheaffer has looked at cropping and harvest management options with Nitro since 1980. He emphasizes that growing Nitro *removes* the options of harvesting forage beyond the seeding year and amortizing establishment costs over more than one year. That's because Nitro isn't reliably cold hardy; it usually winterkills in open, northern winters. He says, "To get maximum forage yield during the seeding year, one must get a good stand and plant as early as possible."

"Growing Nitro gives you a high production option for one year," Sheaffer says. "Nitro requires good management; it must be cut when quality is highest or you'll lose money. Nitro produces high-quality forage that can replace corn or soybean meal in a ration. Unfortunately, the cost of these has gone down, as have alfalfa prices.

"Right now, the economics of growing Nitro may not look as good as several years ago, when nitrogen cost about twice as much. But, when fertilizer prices go up again—and they will—farmers will benefit much more from growing Nitro. A nondormant alfalfa can use the growth period in late fall, and they'll benefit substantially from the extra nitrogen produced."

Unexpected interest in Nitro has come from Canada and North Dakota, according to Heichel. Growers there think they may be able to let the regrowth stand over winter to catch snow, then plant spring wheat in the winterkilled plants.

Barnes says, "Our goal with Nitro is to get people to think about alternatives in crop rotation using forage legumes. Nitro's not an end in itself. It has stimulated a number of seed companies to start to develop nondormant alfalfas that will be even better. These

recommendation table, also based on station research.

For the price of these publications, contact your local county extension office or write to the Distribution Center, 3 Coffey Hall, University of Minnesota, 1420 Eckles Av., St. Paul, MN 55108.

—John Colmey



Weather *continued from p. 2*

winter to measure soil evaporation losses.

At the weather station, Baker and his colleagues use the real world as a laboratory. That is sometimes frustrating, for in an outdoor laboratory it is impossible to control the variables. Dealing with a real world laboratory can also be a courageous act, especially when it is 30 below and the windchill is worse. "You get out there sometimes in the winter and you feel there is nothing but a barbed wire fence between you and the North Pole," Baker says. "Remember the Super Bowl blizzard of 1975? I got out to the station with my husky dog that day, but the wind was blowing so hard I only took a few of the really essential measurements. Then I beat a hasty retreat back to safety and warmth." In spite of such difficulties there is a complete weather observation record (no missing days) since October 1960.

He remains a firm believer in the importance of monitoring the environment as completely and precisely as possible. After all, says Baker, "you can't do much without data."

—Jennifer Obst

tists with the U.S. Department of Agriculture's Agricultural Research Service (USDA-ARS) and the Minnesota Agricultural Experiment Station.

USDA-ARS research geneticist Donald Barnes, who led the effort in collaboration with USDA-ARS plant physiologist Gary Heichel and experiment station agronomist Craig Sheaffer, says Nitro is a special-purpose alfalfa designed for use in the Upper Midwest as a one-year hay source and a fall plow-down crop. He says, "In developing Nitro, we selected for increased concentration of nitrogen in the roots and for larger roots in which to store nitrogen. Since Nitro is nondormant, it provides four to six weeks' additional fall growth and nitrogen fixation than the dormant and moderately dormant alfalfas now grown in Minnesota.

"Nitro is the first commercial alfalfa with specialized nitrogen accumulation attributes. That means it can increase nitrogen inputs into cropping systems and help stabilize or reduce production costs. Nitro's not a new concept; however, the idea of maximizing returns in a cropping system from seeding-year alfalfa is new. Nitro is better suited than all other nondormant alfalfas for single-year forage and nitrogen production in the northern United States.

"The concept behind Nitro is difficult to grasp because we've always measured returns by measuring a crop's yield. We need to look at systems, not only what crop yield is the year you grow it, but its contributions to subsequent crop yields."

Growing legumes such as alfalfa for "green manure" was an important practice before inorganic nitrogen fertilizers became available. Legumes have *Rhizobium* bacteria in the nodules on their roots that "fix" nutritionally useless atmospheric nitrogen into a form useful in plant growth. When a legume is plowed under, the nitrogen-rich leaves, stems and roots enrich the soil and reduce the need for applying commercial

check cultivars. When all cultivars were plowed about October 20, Nitro provided 124 pounds of nitrogen per acre (94 pounds of which were fixed nitrogen), compared to 85 pounds (59 pounds of

"Nitro is the first commercial alfalfa with specialized nitrogen accumulation attributes."

which were fixed) for the best dormant cultivar. Nitro has performed similarly in trials in several other states.

To succeed with Nitro, growers need to understand how seeding establish-

alfalfas that will be even better. These should be available in three to five years. If we can establish public trust with Nitro and establish a new market area, industry will step in and use this as a base. None of us can anticipate how Nitro is going to be used, but producers and agricultural researchers may begin to use their imaginations in considering alternative cropping practices. The success of future nondormant, special-purpose alfalfas will depend on the public awareness and response to Nitro. It will allow us all to try some new farming practices in these days of least-cost agriculture."

Variety protection for Nitro has been applied for. This means that only certified seed can be sold. Next spring, Nitro seed will be available to seed growers through a number of seed companies. However, only a limited amount will be available to farmers in 1987.

—Sam Brungardt

Dairy ORACLE Can Take Uncertainty Out of Herd Management Decisions

The shorter the interval between calvings, the more milk—and profit—a cow produces. But this simple tenet does not give a full picture of the dozens of decisions a farmer must make to run a successful dairy operation.

Dairy ORACLE, a computer program developed by veterinary agricultural economist William Marsh, takes much of the uncertainty out of dairy herd management. Development of the program was funded in part by the experiment station.

The user of Dairy ORACLE provides information on ratios, herd replacement, breeding, culling, disease control, marketing, taxes and operational expenses. Dairy ORACLE then projects the results of these selections on herd performance, reproductive efficiency,

cash flow and net income for 12-month periods, up to a maximum of six years.

"Farmers and bankers should find the program useful when negotiating loans for future operations. Dairy ORACLE's reports show bankers not only the return on investment but the changes the farmer will need to implement to get there," says Diane Fraser of the University's Department of Large Animal Clinical Sciences. The simulation features should also prove valuable to agricultural advisers and educators for demonstrating the impact of managerial decisions in typical dairy herds. "Learning from mistakes made while using Dairy ORACLE is far less expensive than on the farm," says Fraser.

—Chris Ruttan

Is There a Future for Angora Goats in Minnesota?

Bob Jordan is bullish on goats. Angora goats, that is—the goats that produce the silky white mohair prized by the textile industry.

Most of the mohair in the United States comes from Texas, which has one and a half million Angora goats. Minnesota has fewer than 2,000 goats. “We have mostly small flocks of 10 to 15 head, although one producer has 400

“It’s not that they are such picky eaters, it’s just that they are light eaters.”

head, another 200,” says Jordan, animal scientist with the University of Minnesota Agricultural Experiment Station. “However, I definitely believe producing Angora goats can be profitable in Minnesota.”

Mohair is a valuable commodity. At its highest price in 1979 it was selling at \$7 a pound. Since then the price has fallen but right now the average price plus incentive still brings about \$4 a pound to producers. “In New Zealand, Angora goats are selling at ransom prices (\$1,000 to \$10,000 per head), so New Zealanders must believe Angora goats have a bright future,” Jordan says.

But an Angora goat flock is raised much differently in Minnesota than in Texas with its large flocks maintained under extensive grazing conditions. And not a lot of research has been done on how to raise Angora goats profitably under our specific Midwest conditions.

Angora goats. The producer’s goal is to raise healthy goats that produce as much of that beautiful hair as possible. It should be fine, lustrous and white, with plenty of crimp or curl. Mature Angora nannies (does) weigh 70 to 90 pounds and, if fed adequately, can produce 14 to 20 pounds of hair per year. Billies weigh 85 to 120 pounds and shear 20 to 35 pounds of hair annually.

Hair production is very sensitive to nutrition. The choice of feed will determine if an Angora goat operation will be profitable or not, Jordan says.

With a small research flock at the St. Paul campus, Jordan has been studying the nutrition requirements of both nannies and kids. Although goats have gained the incorrect reputation of being willing to eat everything including tin

cans and the kitchen sink, Jordan says that, on the contrary, “the problem is to get the goats to eat enough. It’s not that they are such picky eaters, it’s just that they are light eaters.”

Research has shown that nutrition of the mother is critical to the health and even the hair quality potential of her kid. The problem of light-eating nannies becomes even more critical during gestation. “A pregnant nanny in late gestation needs more energy but her capacity to eat is reduced by about 20 percent,” Jordan says. He has found that during late gestation, 25 to 35 percent grain in the goat’s diet reduces the chance of inadequate energy intake and pregnancy toxemia, and contributes significantly to

Goats continued on back page



BRIEFS

High School Students Appreciate Different Qualities in Their Teachers

High school students’ expectations about their teachers’ classroom styles, friendliness and enthusiasm can influence how comfortable they feel in the classroom, but male and female students differ on the qualities they rate highest.

This is the conclusion that rhetoric professor Earl E. McDowell reached after surveying 164 Burnsville High School sophomores as part of experiment station-sponsored research on communication styles and methods. He questioned them on their expectations of male and female teachers as well as their expectations of teachers of either sex in science and English.

The most highly rated expectations for all categories of teachers were that the student could comfortably talk with the teacher about classroom material, that the instructor enjoy teaching and show enthusiasm for the material, that the teacher encourage class discussion and that he or she seem to want students to succeed.

More than half of the young women surveyed said they felt comfortable talking with a teacher outside of class or about personal matters. Only about 20 percent of young men reported feeling comfortable in such situations.

Significantly more men than women said they expected criticism, inflexibility

Jordan hopes to close that research gap and help Minnesota producers maximize their profits.

For sheep producers, market lambs are the major profit source and wool production is secondary. Not so with



Angora goats produce mohair—a promising new Minnesota crop, according to animal scientist Bob Jordan.

Nearly 60 Percent of High School Seniors Balance School and Jobs

For a majority of high school seniors, September's start of the school year meant more than new classes, teachers and after-school activities. It meant they had to jockey their job schedules to accommodate the 9-to-3 school day.

Dario Menanteau-Horta, associate professor of rural sociology at the University of Minnesota, has studied employment of Minnesota high school students for more than 10 years. During that time the percentages of employed high school seniors rose from about 40



More and more Minnesota high school seniors are filling after school and weekend hours with part-time jobs.

percent to nearly 60 percent.

The experiment station researcher recently surveyed more than 3,000 students throughout Minnesota and compared his findings to a study done 10 years ago. Clearly, he says, more and more young people are in the work force and their work hours are increasing. Statewide, half of the student workers are on the job at least 20 hours a week and nearly 20 percent work close to full time.

What kinds of jobs do teenagers fill? About one-third work in food service. Some 23 percent hold retail sales jobs and 15 percent are babysitters, aides at hospitals and nursing homes, attendants at a variety of facilities and businesses, or other service workers. Smaller percentages do office and factory work, manual labor and farm work.

In general, seniors in the Twin Cities area are the most likely to work, probably because there are more job opportunities there. Nearly 70 percent of metropolitan area students work, compared to just over 50 percent in small outstate communities. While 60 percent of young women students have jobs compared to 56 percent of young men, the men tend to work more hours.

With the ranks of student workers growing steadily, Menanteau-Horta is concerned about the toll on academics. He notes, for example, that about 60 percent of "A" and "B" grade students are employed. However, students with "C" averages worked, on average, about

23 hours a week while "A" students' jobs occupied them for about 17 hours.

"We certainly know that work has benefits for young people," Menanteau-Horta says. "It teaches skills, responsibility and time and money management. But as work hours increase, the benefits of work may be 'instead of' education rather than in addition to it."

For some young people, Menanteau-Horta thinks work becomes an end in itself. Repetitive, unskilled tasks monopolize the time that young people might more productively use for studying, sports, family and social life.

"Twenty percent of high school students work close to full time."

According to Menanteau-Horta, his research points out the need to monitor the effect of employment on young people.

He believes that parents are in the best position to establish priorities for their sons and daughters. "If a job is teaching responsibility and other skills without jeopardizing their studies, it's probably beneficial," Menanteau-Horta says. "But young people have responsibilities toward their school work and their futures too. I hope that these survey results don't indicate that parents and teachers are allowing teenagers to lose sight of that responsibility just because jobs are available."

—Deedee Nagy

and impersonal treatment from their teachers. They also ranked "dramatic" traits such as joke-telling and giving humorous examples to make a point more highly than their female classmates.

In the future, McDowell hopes to follow up on this research by attempting to correlate students' personality types with their expectations of teachers and their expectation levels with their grade point averages. He also plans to compare students' expectations in the lower grades with these senior high students' responses.

—Deedee Nagy

Christmas Tree Market Is Not Likely to Light Up

It takes more than a Santa Claus instinct to grow Christmas trees for a living. And the supply in future years could exceed demand.

So say Charles R. Blinn and Carl E. Vogt, foresters with the University of Minnesota's Extension Service, in their study for the University's Agricultural Experiment Station on the risks involved in growing and selling Christmas trees. More than 200 commercial Christmas tree producers in Minnesota supply trees for markets as far away as Florida.

Many growers in 1986 are expanding their production to help fill the perceived shortage in Christmas tree production. But demand for Christmas trees is not increasing at a rate that will keep pace with the resulting increase in supply, according to the Blinn-Vogt study.

All this means that the risk already associated with marketing Christmas trees will be intensified in the future.

—Mary Kay O'Hearn

Patents *continued from p. 2*

Because the application process is arduous, time-consuming and expensive, Thuente says an important consideration is the presence of "an interested inventor—someone who feels it benefits people, and is willing to go through the process."

"Getting the patent is only the first step," he says. "It's really helpful if we have an inventor do some spadework with us. We try to keep the inventor's fingers in it as much as possible."

Once a patent application has been filed, the inventor and patents office staff work together to find a developer or market for the new product. If a license is sold, royalties are split equally among the inventor, the station and the University. In this way, much of the income can be "plowed back in" for additional research, a big advantage in times of tight research funding.

Despite the "get-rich-quick" stereotype of patented inventions, money is rarely the incentive—and even more rarely the reward. Few inventions even recover the \$5,000 to \$10,000 up-front cost of obtaining a patent. The goal, Thuente says, is not so much to bring money in as it is to extend University-based knowledge to the private sector. And those who seek patents also reap payoffs in recognition and a sense of pride, for themselves, the experiment station, and the University.

—Mary Hoff

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Rosy Glow is a new station release.

New Garden Mum Released

The first garden chrysanthemum to be released in the second century of the Minnesota Agricultural Experiment Station should be a winner. *Rosy Glow* is the 66th garden chrysanthemum bred in Minnesota for the Upper Midwest.

Rosy Glow displays a full canopy of 4-inch, deep rosy-pink, incurved double flowers with yellow centers atop stocky, spreading plants. The stiff stems are clothed with clean, medium-green foliage on plants 15 inches high and 18 inches wide. Flowering usually begins in early September in the Twin Cities area. It is a good propagator, but not quite equal to the exceptional cultivar *Centerpiece*. *Rosy Glow* is adaptable to pot culture as a spring-flowering plant, but grows a bit tall unless given short days or chemical growth regulator treatment.

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Goats *continued from p. 4*

stronger hair fibers, amount of hair, and vitality of the fetus. Providing supplemental lysine and methionine, two amino acids, increased mohair production by 60 percent.

He gave overwintering kids an even higher grain diet with good results. Six-month-old kids fed 30 percent alfalfa and 70 percent grain gained twice as much as those fed 70 percent alfalfa hay and 30 percent grain. "It cost about 70 cents more per kid to feed the 70 percent grain diet during the four months, but the goats produced more hair and, at \$4 a pound, returned \$1.45 per goat greater profit over feed costs," Jordan says. Jordan concludes that for both hannies and kids, under Minnesota conditions, a two-to-one alfalfa hay-to-corn diet is more economical and more productive than all-hay diets.

Jordan believes there are many individual farm situations where raising goats might be practical. "There's a certain amount of synergism in raising goats with cattle, for example, or with sheep," he says. "Goats eat the browse and the cattle eat the grass. Sheep prefer alfalfa leaves and goats prefer the stems. Raising Angora goats may also be appealing to a farmer who doesn't want to deal with lambing. Angora goats kid easily. So the business might be attractive not only to sheep producers but to, say a farmer getting out of the dairy business," Jordan says.

But if you get into raising Angora goats, "don't think your good nannies can make it just on hay," he says. "Learn towards a little higher grain diet."

—Jennifer Obst

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