The Northwest Experiment Station News

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National Wind Erosion Project Started at NWES

Because of the food security act of 1985, conservation plans must be implemented to limit soil erosion to a tolerable level by 1992 for producers to qualify for government programs. A need was identified for a more site specific method to estimate soil loss from wind and water erosion. The USDA-Agricultural Research Service has been charged to develop the new method which is to be based on soil properties which can be measured at each field site. The method will be developed by using computer modeling techniques. For the models to be useful, they must be based on actual field data. In the wind erosion area, little data is available about soil properties such as surface roughness and properties of the aggregates (clods) formed from tillage that influence the susceptibility of soil to wind erosion.

Seven locations across the United States have been chosen as sites to conduct experiments to measure these soil properties. The Northwest Experiment Station in cooperation with scientists with the USDA-ARS unit at Morris, MN is one of these locations. Funds were approved to hire a junior scientist for two years to do this work which entails measuring surface roughness and collecting aggregate samples before and after each tillage operation and also after each rain greater than 1 inch (not much sampling this summer).

Because of the initial work done this year at Crookston, we will also be a location where the model will be validated or "checked out". This means we will be catching and measuring the soil moving by the wind. This will give us an opportunity not only to qualify the amount of soil moving because of wind erosion, but also the chemical composition such as nutrients and herbicides.

You Are Invited to...

BEEF CATTLE DAY

Northwest Experiment Station
University of Minnesota
Crookston, Minnesota

Wednesday, December 7, 1988

Harvey Windels - An Sci., Northwest Experiment Station, Crookston
Brian Larson - Asst. Ext. Specialist - An Sci., Beef Feedlot Nutrition, St. Paul
Charles Nichols - Cow/Calf Owner-Operator (1300 cows) Arnett,Oklahoma
Richard Goodrich - Animal Science Dept. Head, St. Paul

9:30	Registration and Coffee, Ag Research Center Auditorium
10:00	Presiding - Marvin Lee, East Polk County Extension Agent
	Water Additions to High Barley Finishing Diets - Dr. Harvey Windels
	Protein and Nonprotein Nitrogen Sources for Feedlot Cattle -Brian Larson
11:00	**How I Choose a Custom Feedlot For My Calves** - Dr. Charles Nichols
12:00	**Economy of Size & Profitability of Alternative Feedlot Systems** - Paper Authorized by William Lazerus, Ext. Ag. Economist & Presented by Brian Larson
12:30	Lunch - UMC Food Service Bldg. - $4.50
1:30	**Impact of Biotechnology on the Cattle Industry** - Dr. Richard Goodrich
2:00	**Panel Discussion** - Meeting Participants
2:30	Adjourn

Coffee and/or view our feedlot facilities and cattle on trial.

Sponsored by:
Northwest Experiment Station, Animal Science Department, Minnesota Extension Service
University of Minnesota

The University of Minnesota is an equal opportunity educator and employer.

Nathan Derby was hired as junior scientist with the wind erosion project in June 1988. Nathan comes from Norcross, MN and in May 1988 received his BS in soil science from NDSU. Nate enjoys fishing and hunting in his spare time.

Smith's Comments

The last piece of farm machinery has been put away and the Station's farm and maintenance departments are preparing the snow removal equipment needed to help keep the campus and livestock facilities functional for the winter. Last year I dreaded the thought of the upcoming cold months, but after the hot, windy, dry summer just experienced, I'm glad to see winter approaching. This ws indeed a summer that tried one's patience and endurance.

The Station's crop production averaged about one third of normal. Enough forage and grain was secured to maintain the Station livestock research programs at normal levels. The willing cooperation of the Station's employees, friends and neighbors in helping obtain the needed forage, bedding and different types of grains to maintain these research programs was greatly appreciated.

The new grain and feed handling facility started early this past summer is nearing completion. The facility (pictured below) contains a fully automated, computerized grinder-mixer for livestock rations that is fed from eight 1,250-bushel overhead bins. The ground experimental rations can then be transferred to eight holding bins of various sizes located in the building or transferred to other ration bins located around the Station. Five 10,000-bushel storage bins, with full floor aeration, are available for storing the Station's grain production. Grain from these bins can be transferred or mixed via a leg system to the grinding-mixing area, other bins or delivery vehicles. An 80,000 lb. electronic scale used to record grain and forage production rounds out the facility. Vigen Construction is the major contractor for the facility.

In the upcoming months the Dairy Research and Teaching Facility will finally be completed. Bids on the milking parlor equipment have been accepted, with installation, hopefully, beginning within a month. Once this equipment is installed, the Station's maintenance department will finish the interior walls and floors. This project would not have been possible without the support, both morale and financial, of the dairy producers, suppliers and manufacturers of Minnesota.

The announcement of the resignation of Dr. Richard Sauer, the University of Minnesota's vice president for agriculture and its interim president for the past few months, has saddened many in northwest Minnesota and I'm sure the entire State. Dr. Sauer's dedication to the research, education and extension missions of the University will be missed greatly. To him and his wife, Betty, we wish continued success and thank them for their years of service and support of the University's programs here in northwest Minnesota.

Have a good holiday season.

Calendar of Events

BEEF CATTLE DAY
DECEMBER 7, 1988

DAIRY DAY
JANUARY 11, 1989

BEEF COW - CALF DAY
RED LAKE FALLS
JANUARY 18, 1989

BEEF COW - CALF DAY
SOLWAY
JANUARY 19, 1989

RED RIVER VALLEY
WINTER SHOWS
FEBRUARY 17-23, 1989

INTERNATIONAL
SUGARBEET GROWERS
INSTITUTE and MACHINERY
SHOW
MARCH 15 & 16, 1989

CROPS and SOILS DAY
JULY 19, 1989

Merry Christmas
&
Happy
New Year

From the Northwest Experiment Station Staff

Hoppers

by Carlyle Holen, Area Extension Agent, Crop Pest Management

Depending on your perspective, the dry weather during 1988 wasn't all bad, especially if you were a grasshopper. Grasshoppers, as most crop producers know, like it hot and dry; a drought is even better. Dry weather and long, warm falls with just enough moisture to keep fall row crops green, provide ideal conditions for egg production and keep disease epidemics of adults low.

Weather conditions during the past two years are letting us see (or live through) a nearly textbook version of how grasshopper populations increase. Entomologists specializing in grasshopper management believe several situations are usually present before populations increase. First, populations typically build up over two or more years before there is a dramatically observable difference in numbers. Small but steady increases are important, however, in determining the final severity of the grasshopper population. Most people will not notice a doubling (2x) increase in numbers if, for example, the "normal" population increases from 1 grasshopper/sq. yd to 2/sq yd. If during the next year we have another 2x increase, the ending population of 4/sq yd is still not at economic levels. However, exceptionally favorable conditions the next year may allow a 4x or 5x increase and the grasshopper population can now increase from 4/sq yd to 16 or 20/sq yd.

An examination of Minnesota Department of Agriculture survey summaries reveal that the high numbers of grasshoppers we observed this year have been building slowly since 1986. Under direction of Dharma Sreenivasam, entomologist, Minnesota Department of Agriculture, grasshopper surveys are conducted late each August in alfalfa fields. In 1986 in northwest Minnesota the numbers averaged between 1 and 2/sq yd. In 1987 the numbers increased to 2.3 to 6.6/sq yd or approximately a 2x or 3x increase. In 1988 the surveys were expanded to several crops and the results of the surveys in Kittson and Marshall counties showed a range from 2 to 19 grasshoppers/sq yd.

Second, weather conditions must be favorable not just during the present season but, most importantly, in August and September of the preceding year. This is the time when eggs are laid and if conditions are warm and there is plenty of available green plant materials to consume, the egg production of the female will be optimized. Grasshoppers don't have exceptionally high egg laying ability, but a single female migratory grasshopper can produce up to 400 eggs if conditions are favorable. Conversely, if the fall plant material is mature and dry and the weather conditions are cool, the female grasshopper may only produce 40 eggs. A tenfold difference egg production! It probably shouldn't be surprising that many crop producers who experienced grasshopper problems early in the season this year, reported that their 1987 soybean land had the highest numbers since soybeans provide an ideal green forage late into the fall. Judging by all the grasshopper activity in soybean fields this past fall, it may be a safe bet to assume that fields in 1989 with an '88 soybean field history will need to be closely monitored this spring.

Table 1. Weather Summaries Collected at Northwest Experiment Station

	1986	1987	1988	90-yr avg.
August mean temperature (°F)	63.90	64.70	70.10	67.40
August precipitation (inches)	1.62	3.13	1.56	2.90
Jan.-Aug. precipitation (inches)	14.27	15.76	9.77	15.70
September mean temperature (°F)	54.95	58.10	56.30	57.50
September precipitation (inches)	2.24	1.64	2.98	2.16
Jan.-Sept. precipitation (inches)	16.51	17.40	12.75	17.69

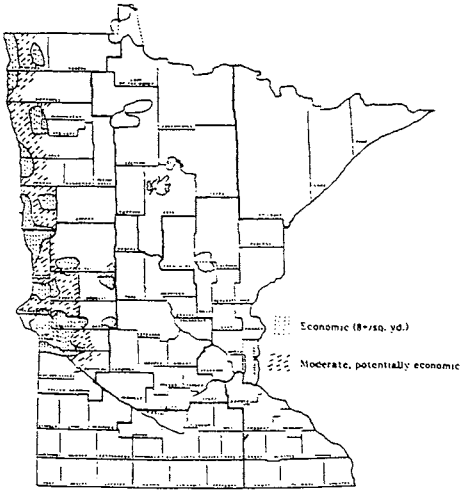
What have the fall weather conditions been like the past three years? Table 1 summarizes August and September weather since 1986 from the Northwest Experiment Station. If the ideal environment for grasshoppers is below normal moisture and above normal temperatures, it's apparent that the weather has been favorable "at times" but probably not exceptionally favorable.

Third, grasshopper outbreaks usually occur during low moisture years. It's not that rainfall itself is harmful to grasshoppers but, among other effects, it provides conditions for increases of fungal and bacterial diseases. A Canadian entomologist has suggested that one reason that the Red River Valley doesn't regularly have outbreaks of certain grasshopper species is that our "humid" weather during the summer generates disease epidemics that causes grasshopper populations to decline.

How widespread were grasshoppers in Minnesota this year? Figure 1 summarizes grasshopper work collected by Ardell Knudsvig, survey entomoligst with the Minnesota Department of Agriculture. As this map indicates, there were many areas in the Valley with high

(continued on p. 5 column 3)

Fig. 1 Intensity of grasshopper infestation in 1988 (Minnesota Pest Report, Minnesota Department of Agriculture August 26, 1988)



New Employees and Graduate Student Program at Northwest Experiment Station

Eugene Peters, the new junior scientist in agronomy, is originally from St. Paul, Minnesota. Gene joined the staff in June and is working with Dr. John Wiersma.

Gene served as an agricultural mechanic with the U.S. Peace Corps in Liberia, West Africa. He then attended the University of Minnesota, St. Paul, where he received a BS degree in soil science.

Prior to his employment at the Northwest Experiment Station, Gene was employed for three years at Jacques Seed Company in Prescott, Wisconsin.

Gene and his wife, Patty, have 3 (almost 4) children; Bess, Nathanael, and Benjamin.

Welcome to the Northwest Experiment Station, Gene.

Cheryl Ann Engelkes moved to Crookston in June, 1988 to begin her field research as a doctorate candidate in plant pathology. Her graduate student stipend is funded jointly by the Northwest Experiment Station and the College of Agriculture, University of Minnesota. The graduate student program is a new initiative for the NWES. Graduate student housing is located on the University of Minnesota, Crookston campus.

Cheryl is the first graduate student at the NWES. She will spend the next two summers at Crookston conducting field research and nine months each year on the St. Paul Campus taking classes and doing greenhouse and laboratory experiments. Her thesis research will examine the host range of *Rhizoctonia solani,* which causes crown rot and root rot on sugarbeet, and determine how long the pathogen persists in soil. She is co-advised by Dr. Carol E. Windels, Plant Pathologist at the NWES, and Dr. Neil Anderson, Department of Plant Pathology, St. Paul.

Cheryl is a native of Adrian, MN (that's in the southwest corner of the state!) and grew up on a corn and soybean farm. She has a B.S. degree (with distinction) from the University of Minnesota with majors in Plant Health Technology and Horticulture and a M.S. degree from Michigan State University in Horticulture. She is a member of several honor societies and has been awarded numerous scholarships.

The newest member of the accounting/secretarial staff at the Northwest Experiment Station is **Anne Marie Burke.** Anne is a senior accounts Assistant, working primarily with accounts payable and inventories. Anne has spent many hours getting fuel, grain and machinery records computerized. This winter she will also be assisting with correspondence for the research staff.

Anne is very well qualified and most recently worked with the Red River Valley Winter Shows for 7½ years. She and her husband , Keith, live on a farm west of Eldred. They have two children, Alyssa, 8, and Chris, 6.

In her spare time, Anne likes outdoor activities and working with her horse.

Welcome to the Experiment Station, Anne.

Post - Drought Alternatives For Dairymen

by G. D. Marx, Dairy Scientist

For the last 20 years, the Northwest Experiment Station has had a considerable research effort to find profitable alternatives for feeding the dairy animal. This year is a good example when many dairymen are forced to make alternative choices in their dairy operation because of the severe drought, especially here in northwestern Minnesota. Yields of conventional forages and grain were down severely in this area which means additional feed purchases may be necessary.

FORAGE NEEDS

Forages seem to be the most critical need on many individual farms. If your forage supplies are not adequate for the balance of the feeding year, one should make some sound management and economic decisions. In general, much of the harvested alfalfa has been of good to excellent quality and has been harvested with little or no rain damage. Much of the hay cut from the Conservation Reserve Program acres was cut later in the season and quality is lower primarily because of advanced maturity.

Forage testing for nutritive value is even more important this year. When buying forages, be sure to know what you are getting and should be purchased on relative feed value, (RFV). High producing cows and small growing calves require a quantity standard of #1 or Prime with a relative feed value over 125. Yearling heifers and dry cows can utilize hay with a lower RFV which should be reflected in a lower price. In many cases, dairymen are feeding their own high quality hay or haylage to their most productive animals and buying cheaper, lower quality hay for their other animals. This is usually the best economic strategy, however, one must remember to adequately balance the diet to make up for the poorer quality hay in the ration.

Sometimes a dairyman can substitute grain for forage if one can maintain at least 40% of the lactating cow's diet as forage and if it is cost effective. If fiber levels are not maintained because of high grain feeding, several problems may develop, especially milk fat depression and digestive disorders. When testing forages be sure to include fiber as one of the components to be tested, and follow the recommendations for fiber requirement of the various types of dairy animals.

PROTEIN NEEDS

Do not cut back on protein unless you are overfeeding protein. However, you may save money if you can feed the high protein forage to high producers and the low protein forages to dry cows and heifers. University of Wisconsin research has shown that cutting protein below the cow's requirement in the first half of lactation has cost the dairyman $4.00 in milk for each $1.00 saved in protein. This again emphasizes the importance of protein testing in feeds. Supplemental protein is costly which makes both overuse and underuse economically important.

Many dairymen are considering alternative supplemental protein sources because conventional soybean meal has skyrocketed in price. Many of these high protein sources, primarily by-product feeds available locally, have been researched at the Northwest Experiment Station. These include sunflower meal, canola meal, cull beans, rough fish meal, lupins, dried distillers grain, whole sunflower seeds, cracked and extruded soybeans. Also, one might consider wet or dry brewers grains, corn gluten feed or meal, wheat middlings, linseed meal, cottonseed meal, peanut meal, soybean hulls and such exotics as feather meal, blood meal and horse beans. Some of the whole seeds such as sunflower, soybean, cottonseed, canola, and edible beans are not only good protein sources, but also excellent sources of energy (mainly from the oil content) and high in fiber content (primarily from the outer shell). A non-protein-nitrogen product such as feed grade urea might also be considered in some situations as a source of nitrogen for protein synthesis by microorganisms in the rumen.

The number of alternative feeds and products are many. Our management abilities and decision making are highly important in years such as this one. For example, we may not want to buy, or be able to afford the extra purchased feed it will take to meet all the animals' needs. In some herds it would be better to cull, using recommended culling techniques such as low producers, cows with high somatic cells or chronic mastitis, problem cows as old-arthritic, inferior, and nonbreeders. One might consider culling herd replacements as well as heifers with poor genetics potential or discontinue feeding out the dairy males to save or extend your feed supply.

SUMMARY

In summary, there are many differences in nutrient content, potential usefulness and economics of the many feed alternatives. Feed values vary greatly. The first step should be to test the various feeds utilized in your ration, especially forages, not only for nutrient content but also for nitrates and other potentially dangerous substances. Be sure to use you DHI records and all the management information it provides. Your county extension offices throughout the state have been provided with technical and producer orientated written materials that may be useful in this unusual year. Most of these articles are written by state specialists and provide many ideas to help dairymen with problems resulting from the drought. Keep up the dairy spirit in this period of adversity; milk prices are slowly creeping upward and hopefully will continue in the future.

(Hoppers continued)

enough numbers (8 or more grasshoppers/sq yd) to require treatment.

Was 1988 our peak outbreak year or will we see (live through) even higher numbers in 1989? Who knows? If we make judgments based solely on the size of our overwintering egg population, it would appear there is the potential for a large grasshopper increase. However, a cold, open winter could increase egg mortality; a cold, rainy spring could cause high nymph (young grasshopper) mortality; or a humid summer could cause a major grasshopper disease epidemic. It is also important to note that grasshopper populations usually decline as rapidly as they "seem" to increase.

I'm sure Mother Nature will let us know in due time.

New Associates 1000 Members Honored at Torch & Shield Banquet

New members of the Associates 1000 Club honored during the Torch and Shield Banquet held recently at the University of Minnesota Crookston were:

Seated left to right: Lucille Weiss-Red Lake Falls, Gayle Nelson-Crookston, Mary Bywater-Crookston, Merliene Vennes-Fosston, Dottie Adkins-Detroit Lakes, Barbara Bernhardson-Moorhead, Kay Preston-East Grand Forks, Virginia Stainbrook-Crookston, Arley Schultz-Red Lake Falls

Second row left to right: Erwin Weiss-Red Lake Falls, Robert Nelson-Crookston, John Bywater-Crookston, Ken Pazdernik-Ada, Joel Vennes-Fosston, Clifford Adkins-Detroit Lakes, Faith Knott-Red Lake Falls, Eddie Bernhardson-Moorhead, Barbara Weiss-Red Lake Falls, Lori Schultz-Red Lake Falls, Dorothy Hamrick-Warren, Marilyn Grave-Schubert-Crookston, Pat Schultz-Red Lake Falls

Back row left to right: Rod Soderstrom-Warren, Dorothy Soderstrom-Warren, M. Jerome Voxland-McIntosh, Duane Knott-Red Lake Falls, Duane Preston-East Grand Forks, Arlan Weiss-Red Lake Falls, Lyndon Schultz-Red Lake Falls, Warren Hamrick-Warren, L. Elliot Shubert-Crookston

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