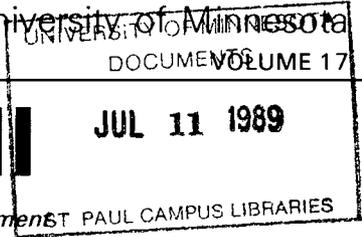


The Northwest Experiment Station News

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Hoppers II

by Carlyle Holen, Area Extension Agent, Crop Pest Management



A major grasshopper epidemic is occurring in portions of northwestern Minnesota this year. Grasshopper populations in a CRP field north of Crookston were estimated at 300 to 400 per square yard on June 15 and egg hatch was still occurring! Fortunately, the average grasshopper population is much less, but 15 to 30 grasshopper nymphs/sq yd is not an uncommon infestation in fields and borders where problems are occurring.

In ancient literature grasshoppers were called locusts. In Latin an equivalent term for locust means "a burned place". Crop producers that had sugarbeets or small grain headlands eaten to the ground would probably agree that the term was thoughtfully selected. Crop damage from young grasshoppers can occur very rapidly on young seedlings, but the amount of plant material consumed is much smaller than daily consumption rates by adults.

It has been estimated that grasshoppers consume approximately 1/2 their body weight in green forage per day. An additional 50% of the total forage reduced in a field is wasted by clipping leaves and plant material that drops to the ground.

The table lists daily consumption and wastage rates for different grasshopper species. Of particular interest to me are the differences between daily nymphal and adult consumption rates and the large differences between species. Even though the two common species in this area are not included in this table, one could probably summarize that the two-striped grasshopper, which is quite large, would be a much more damaging grasshopper than the red-legged which is much smaller in stature. From this data it is also apparent that you must watch adult feeding very closely to prevent damage that may occur fairly rapidly. Adult grasshopper infestations that build up in row crops such as soybeans, sun-

flowers and corn as the small grains are harvested will need to be watched especially close.

There are a number of methods we could use to control grasshopper populations. Perhaps the most original approach I found was in a letter to the editor of the U of M *Entomology Newsletter* written by Whitney Cranshaw, Extension Entomologist at Colorado State and former U of M Extension Entomologist, as follows:

"...First of all I feel that the state of Colorado was overlooked as a major if not the major grasshopper producing region in the United States. For some reason this fact is suppressed by the Chamber of Commerce and other misguided state agencies. During the late great outbreak of 1985 (which encompassed most of the state) reports were received of populations exceeding 200/square yard.

As part of our overall IPM approach to this problem a number of research efforts have been pursued here at C.S.U. My involvement has largely been biological

control by eating them. My special expertise as a French fry taste tester for Shirley Munson at Minnesota gave me adequate preparation for this research.

1985 findings can be briefly summarized as follows:

1. Roasted and salted grasshoppers are significantly preferred over tempura prepared hoppers;
2. Redlegged grasshoppers are more tasty than are differential or 2-striped grasshoppers;
3. Male grasshoppers are preferred over female grasshoppers.

I do suggest some preparations before sitting down to a plate of your favorite hopper dish. Generally we would feed the grasshoppers on lettuce for at least 48 hours followed by a 24 hour starvation period to purge the gut. This is similar to that used for preparation of escargot."

If you give this biological control method a try, save me a plate of two-striped.

Forage Consumption and Wastage by Grasshopper Nymphs and Adults in Laboratory and Field Trials (from Hewitt, 1977)

Study	Stage	Species	Forage Reduction* (mg/day)
Laboratory	Nymph	Clear Winged Grasshopper	11.7
		Lesser Migratory Grasshopper	27.9, 19.2
	Adult	Clear Winged Grasshopper	38.7
		Lesser Migratory Grasshopper	83.0
Field	Nymph	Clear Winged Grasshopper	10.1, 19.3
		Striped Slant-faced Grasshopper	13.1
	Adult	Clear Winged Grasshopper	96.0
		Striped Slant-faced Grasshopper	53.0

*Different values represent results of separate trials

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Smith's Comments



After last year's drought, the green lawns and fields are indeed a cheerful sight. The rains of recent weeks have heightened optimism that normal crop yields will be attained this year. The cool temperatures in June resulted in lush growth of the small grain crops, but delayed development of the warm season crops such as corn and soybeans, but they are catching up rapidly. If Mother Nature continues to cooperate, the Station should have enough grain to test the new grain and feed handling facility completed in December.

On June 23, the Station's dairy herd reluctantly had their first experience in the recently completed milking parlor. Most of the herd was fairly cooperative, but there are always a few who do not like modern technology. To say these animals

tested the temperament of the dairy crew would be an understatement.

Another old landmark on the Station is about to disappear. The grain elevator constructed in 1914 is scheduled to be demolished later this month. The single car garage the Soil Science Department works out of will also go with it. A temporary facility will be constructed for their use. Hopefully, funds will be appropriated for a permanent facility in the near future.

The Station's Annual Crops and Soils Field Day is scheduled for July 19. Last year's summer field tour was moved to the fall because of the drought effects on the small grain and herbicide trials, so this will represent the first opportunity in two years to view the new wheat and barley varieties in side-by-side comparisons as well as new advances in weed control. In addition to the field tours the new milking parlor in dairy as well as the new grain and feed handling facility will be open for viewing. We hope to see you on July 19.



L to R: Marlyn Jacobson, Phil Thom and Mike Poole observing the automatic milker take-off device in the new double-five herringbone milking parlor that was recently completed and put into use as part of the dairy research and teaching center.

Calendar of Events

MORRIS FIELD DAY
JULY 13

NEWS CROPS and SOILS DAY
JULY 19

GRAND RAPIDS FIELD DAY
JULY 20

UMC ALUMNI REUNION
JULY 29

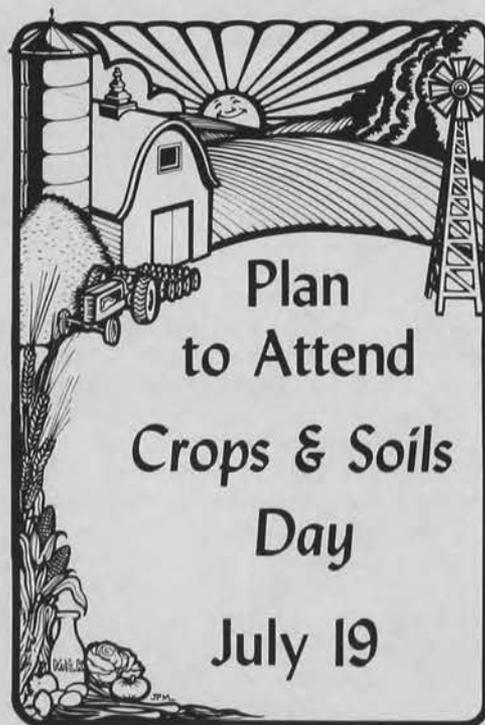
MORRIS FALL FIELD DAY
SEPT. 12

BEEF CATTLEMEN'S INSTITUTE
OCT. 26

SHEEP DAY
NOV. 2

BEEF DAY
DEC. 5

DAIRY DAY
JAN. 1990



Water Quality and Public Awareness

by Bobby J. Holder

Water quality management and protection has recently emerged as a national public concern within the United States. Just a few short years ago, hydrologists, hydrogeologists and water resource managers were unaware of many potential pollution sources and the extent of water contamination.

Back in the early 1970's as a graduate student in water resource development and water chemistry, my studies were restricted to surface waters, e.g. lakes and streams. The major contaminants of concern at that time were inorganics such as nitrates, phosphates, heavy metals as well as certain microbiological counts such as fecal coliform. Few were even aware that the groundwater was susceptible to contamination.

One of the major difficulties with groundwater contamination is that it occurs underground, out of sight. The polluting sources are not easily observed nor are their effects often seen until damage has occurred. There are no obvious warning signals such as fish kills, discoloration, or stench that typically are early indications of surface water pollution. Where contamination affects pumping wells, some indications may occur, although many commonly found contaminants are both colorless and odorless and occur in very low concentrations.

Through a combination of federal laws, court cases, and increased attention from the media, the institutional, scientific and public perception of surface water and groundwater have been changed. Unlike a few years ago, water pollution today, and particularly groundwater pollution, is perceived by the public as pesticide contamination.

Today's awareness of water quality is evidenced by increasing activities at both local and state levels of government, in the congress, in universities, and in a variety of federal agencies that have responsibilities in this area. The general public is becoming more knowledgeable about the nature of water, the extent of its usage, and that its future usefulness is affected not only by our waste disposal activities, but also by many consumer choices. These choices encourage the production of new synthetic organic chemicals each year, and unless proper

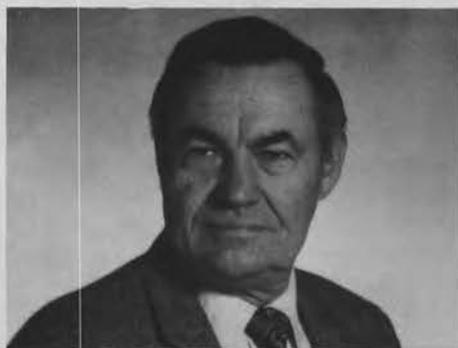
precautions are taken, the disposal of which may ultimately lead to water pollution.

Water is one of our precious resources. Everyone has the responsibility to assist with the improvement and protection of water for the benefit of both urban and rural populations. Good clean water is needed for domestic consumption while industry and agriculture require sufficiently good quality water to permit sustained production. Contrary to popular belief, these consumption demands are **not** mutually exclusive, and can be maintained if proper precautions are taken.

Current debate among agricultural and environmental scientists should not so much relate to whether or not industrial, domestic, and agricultural practices contribute to surface and groundwater contamination, but how to deal with the causes and consequences of the prob-

lem. Some disagree with certain limits that have been set for many of these contaminants that are entering our waters. Some say our levels are too high while others say they are too low. I think this sort of debate is missing the whole point of maintaining good quality water. Simply because a limit of 10 ppm has been set for $\text{NO}_3\text{-N}$ doesn't mean that there should be no concern until this level is reached. If this were the case, theoretically, all our waters could reach this 10 ppm level. In order to maintain good quality water, the quality should be impacted as little as economically and scientifically possible. Unfortunately there will be limits set for certain constituents. Why? For the same reason there are speed limits. You can't just "drive safely" because this term doesn't mean the same thing to everyone. Likewise, water is impacted differently depending upon its use.

Behrens Honored At Range Dedication



A research range on the Agronomy farm of the Northwest Experiment Station will be named in honor of Professor Emeritus Richard Behrens, researcher, teacher and advisor in the Department of Agronomy and Plant Genetics, University of Minnesota, on July 18, 1989. The dedication of this range is just one of many testimonies to the outstanding contributions he has made to agriculture in northwest Minnesota as well as the State and Nation.

Dr. Behrens began his career with the USDA at Texas A & M University, College Station, Texas in 1952. In 1958 he joined

the faculty of the Department of Agronomy & Plant Genetics, University of Minnesota, where he remained until his retirement in 1986. During his tenure at the University, his research in weed science was devoted to studies on the uptake, translocation, selectivity and mode of action of herbicides. Coupled with this research was the development of research techniques and equipment that permitted detection, quantitation, and control of factors more effectively than had been possible previously. His research led to numerous scientific and popular publications, as well as speaking engagements. In addition to his research he was advisor to numerous M.S. and Ph.D. students with global implications.

The research range dedication is designed to honor people who have made genuine and long lasting contributions to agriculture and northwestern Minnesota in particular. Dr. Behrens joins past honorees, Henry Borgman, Carl Ash, Ray Dunham, Drs. Olaf Soine, Robert G. Robinson, Jean W. Lambert, Elmer R. Ausemus and B.E. Youngquist.



Vegetable Research Expanding

An applied research program to help develop commercial vegetable production in northwest Minnesota is continuing this summer as a result of a grant from the Northwest Minnesota Initiative Fund. Dr. Gary McVey is the project director and expert on mechanization as it relates to planting, harvesting, irrigation and post harvest handling to insure quality. Dr. Larry Smith is assisting with cultural practices.

The major focus of the project is the cole crops; broccoli, cauliflower and cabbage. Parameters being researched include varietal selection, planting dates, population and produce quality. In addition to these crops; tomatoes, peppers, eggplant, celery, melons, onions, asparagus, strawberries and raspberries are being evaluated for potential in northwest Minnesota.



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Patti Malme, Associate Editor

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Broekemeier Receives Award



Jim Broekemeier received the Third Annual Northwest Experiment Station EMPLOYEE OF THE YEAR Award recently.

Broekemeier, a farm animal attendant with the dairy research project, began working at the Station as a high school student. He continued working summers, weekends and holidays while attending college and joined the staff as a full time employee in 1981. Jim's day begins early as he is one of the "milkers" and is on the job by 3 a.m.

Jim was nominated by his co-workers to receive the award because of his positive attitude toward his work and his helpfulness to fellow employees.

The Employee of the Year Award was designed to promote and recognize excellence in job performance among Civil Service and Bargaining Unit personnel. Funds for this award come from a President's Club donation designed for this purpose.

Congratulations, Jim, on receiving the Employee of the Year Award.

Jacobson Named West Polk Co. Honored Dairyman at RRVWS

Selected as West Polk County's 1989 honored Dairyman at the Red River Valley Winter Shows was Marlyn Jacobson.

Marlyn, a graduate of the University of Minnesota, St. Paul, in dairy science, is an assistant scientist with the dairy research project at the Northwest Experiment Station. In addition to his research duties, Marlyn has also taught classes in dairy science at UMC and spent 4 months as a dairy instructor at the University of Damascus, Syria. Marlyn is a member of the Red River Valley Holstein Club and the Red Lake D.H.I.A. Marlyn has seen many changes in the dairy industry in Minnesota and in the dairy operations at the Northwest Experiment Station.



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