

INTEGRATOR



USDA-ARS Northern Great Plains Research Laboratory

Mandan, ND

Dynamic Cropping Systems for the Northern Great Plains

Northern
Great
Plains
Research
Laboratory

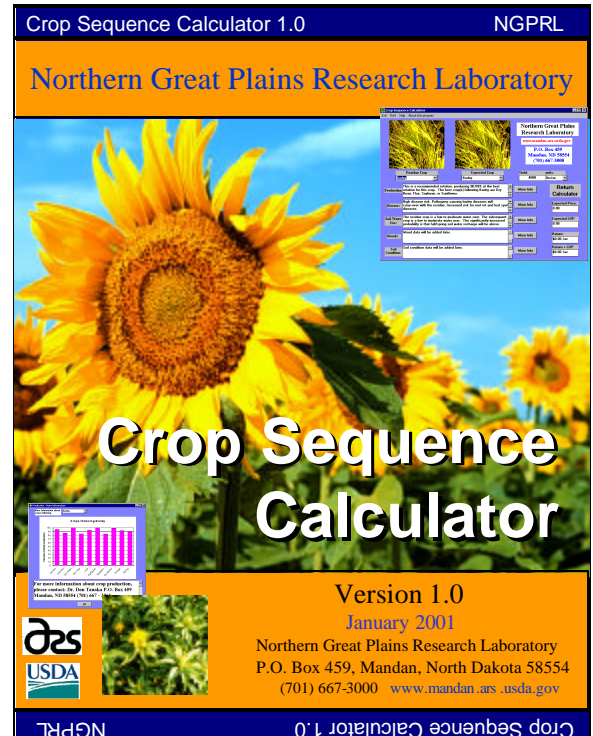
Our Vision:

An economically sustainable and environmentally sound agriculture.

Crop production occurs under dynamic conditions. The weather, commodity and input prices, government programs, and technology change from one growing season to the next. In order to optimize production, economic, and resource conservation goals, producers have to make sound management decisions that take into account these changing factors. This, to say the least, is not a simple task. Producers need to be able to integrate vast amounts of information, and understand it well enough to take advantage of situations when the factors interact (e.g., choosing the most profitable crop to take advantage of abundant [or deficient] soil water).

Given that we live in a time where we're awash with information, producers need help processing the abundance of 'data' related to agricultural management. To this end, scientists at NGPRL have developed a computer program entitled "Crop Sequence Calculator" to help producers assess crop production options for the Northern Great Plains. The program can calculate the expected yield of ten crops: barley, dry bean, canola, crambe, flax, field pea, safflower, soybean, sunflower, and wheat grown in any two-year combination. Crop prices and loan deficiency payments can be entered into the program to provide rapid calculations of potential gross returns. Information on plant diseases, weeds, crop water use, and soil quality is also included in the program, aiding producers in their evaluation of management risks associated with different crops and crop sequences. Data in the program were obtained from a crop by crop-residue matrix experiment conducted on the Area IV ARS/SCD Research Farm southwest of Mandan, ND.

The program runs directly from a CD-ROM, and is designed for computers running Windows (3.1/95/98/ME/NT/2000). The program may be requested from the NGPRL website (www.mandan.ars.usda.gov) or by mail. Comments and feedback on the Crop Sequence Calculator are encouraged and can be sent to Joe Krupinsky at (701) 667-3011 or krupinsj@mandan.ars.usda.gov.



CD case cover of the Crop Sequence Calculator, Version 1.0.

Inside this issue:

History of NGPRL: 1970-Present	2
Organic Production Practices can Improve Soil Quality	3
NGPRL Update	3
Upcoming Events at NGPRL	4

History of Northern Great Plains Research Laboratory: 1970-Present

The 1970s brought new research programs to NGPRL in mine-land reclamation, forage and tree breeding, and conservation tillage. The windbreak program was closed in 1975, but then re-opened the very next year with the hiring of a tree geneticist and a plant pathologist. The forage and range research program was expanded in the 1970s by adding a forage breeder, an agronomist, and an animal scientist. However, by late 1970s,

research programs at NGPRL contracted somewhat with the closing of the mine-land reclamation program and the relocation of the irrigation research field site from Oakes, ND to within a few miles of the station.

The last of the resident employees moved off the station in the 1970's. During this time, many buildings were given a substantial facelift with the installation of white steel siding. The slate roofs on the buildings were also replaced with new shingles and the roads leading to and around the headquarters were paved.

Significant research advances oc-



Aerial view of NGPRL headquarters.

curred in the 1980s at NGPRL. Examples include the development of Manska and Reliant intermediate wheatgrasses, Rodan western wheatgrass, and Mankota Russian wildrye. In 1984, the Area IV Research Farm was established as the result of a specific cooperative agreement between USDA-ARS and local Soil Conservation Districts. The Research Farm, located approximately 3 miles southwest of station headquarters, was established for conservation tillage and cropping systems research.

The 1990s were a difficult time at NGPRL. The windbreak program was closed for the third and possibly

final time. The irrigation research program was also discontinued. In the late 1990s, the station was selected for closure by Congress. With strong support from the agricultural community, however, politicians were able to fight off the closure attempt.

Today NGPRL is stronger than ever, with research programs in dynamic cropping systems, integrated forage, crop, and livestock production systems, and switchgrass biofuel production. There are currently 12 scientists on staff. Assisting the scientists are 25 support personnel, along with an additional 20 employees during the summer months. With over 2500 acres of land and updated headquarters, laboratories, and greenhouses, NGPRL is poised to make significant contributions to agricultural research in the decades to come.

(This is the last installment of a three-part article.)

Jeff Fehmi, Former NGPRL Post-doctoral Research Associate.

Organic Production Practices can Improve Soil Quality

Interest in food produced without the use of synthetic fertilizers and pesticides is increasing. Such food is commonly referred to as organic. In the last ten years, annual growth in sales of organic food in the U.S. has averaged 20%. The trend in the organic food industry implies there will be greater adoption of organic practices by farmers in the future. Understanding the effects of these practices on soil is important. Doing so will allow farmers, conservationists, scientists, and policy makers to better understand the relative sustainability of organic farming as an agricultural production practice.

From 1994 to 1996, a study was conducted to determine the effects of organic and conventional production practices on soil quality indicators for farms in North Dakota and Nebraska. Farms were paired by soil type, and were often adjacent fields. Management practices on the organic farms were such that no synthetic fertilizers or pesticides had been used

in production for a minimum of three years prior to the study. Monoculture cropping with frequent and intensive tillage best characterized the management practices used on most of the conventional farms. Soil properties recognized as basic indicators

of soil quality were measured at depths of 0 to 3 and 0 to 12 inches on the farms. Monoculture cropping with frequent and intensive tillage best characterized the management practices used on most of the conventional farms. Soil properties recognized as basic indicators

of soil quality were measured at depths of 0 to 3 and 0 to 12 inches on the farms. Monoculture cropping with frequent and intensive tillage best characterized the management practices used on most of the conventional farms. Soil properties recognized as basic indicators

“...there was 22% more organic carbon (11,220 lb C/ac) and 20% more total nitrogen (866 lb N/ac) on organic farms as compared to conventional farms in the surface 12 inches of soil.”

of soil quality were measured at depths of 0 to 3 and 0 to 12 inches on the farms. Monoculture cropping with frequent and intensive tillage best characterized the management practices used on most of the conventional farms. Soil properties recognized as basic indicators

of soil quality were measured at depths of 0 to 3 and 0 to 12 inches on the farms. Monoculture cropping with frequent and intensive tillage best characterized the management practices used on most of the conventional farms. Soil properties recognized as basic indicators

NGPRL Update

Personnel

Jeff Fehmi, postdoctoral research associate working with Jon Hanson, accepted a position with the U.S. Army Corp of Engineers as an Ecologist in Champaign, IL. Jeff contributed greatly in his short stay at NGPRL, creating the Crop Sequence Calculator and expanding the crop database for the Root Zone Water Quality Model.

In the past year, three members of

the NGPRL support staff retired. Richard Huppler (Biological Science Technician), Jim Harms (Physical Science Technician), and Ralph Feland (Maintenance Mechanic Supervisor) are credited for many years of steadfast service to ARS.

Winter Meeting a Success

On January 24, 2001, NGPRL combined efforts with the Area IV SCD and National Sunflower Asso-

ciation to present a research and technology transfer conference for local producers. The conference was attended by over 160 people and was highlighted by a group presentation of the Crop Sequence Calculator. Additional presentations reviewing ongoing research at NGPRL were also given. A report of the conference can be requested from the NGPRL website (www.mandan.ars.usda.gov).

NORTHERN GREAT PLAINS

INTEGRATOR

Newsletter of the Northern Great Plains
Research Laboratory

United States Department of Agriculture
Agricultural Research Service

USDA-ARS-NGPRL
P.O. Box 459
1701 10th Ave., S.W.
Mandan, ND 58554-0459

Phone: 701 667-3001
Fax: 701 667-3054



PASS IT ON!!!

Feel free to pass on this issue of *Northern Great Plains Integrator* to others interested in agricultural research in the Northern Great Plains.

To be added to our mailing list, request a copy through our website or contact Audrey Myers by phone (701 667-3001), fax (701 667-3054), or e-mail (myersa@mandan.ars.usda.gov).

Upcoming Events at NGPRL

Dynamic Agriculture: Keys to Success

USDA-ARS-NGPRL / Area IV SCD
'Friends and Neighbors Day' and
Annual Field Tour

Thursday, June 28, 2001

Highlights and Schedule

- Open House, Facility Tours, Children's Booth, and Social, 1-7 p.m.
- Registration for Field Tour, 3:30 p.m.
- Field Tour, 4-7 p.m.
- Barbeque and Speakers, 7-8 p.m.

Tour topics will address six 'Keys to Success' for agriculture in the Northern Great Plains.

Keys to
Success:

Adaptability

Diversity

Multiple Enterprises

Environmental Awareness

Information Awareness

Reduced Input Costs

