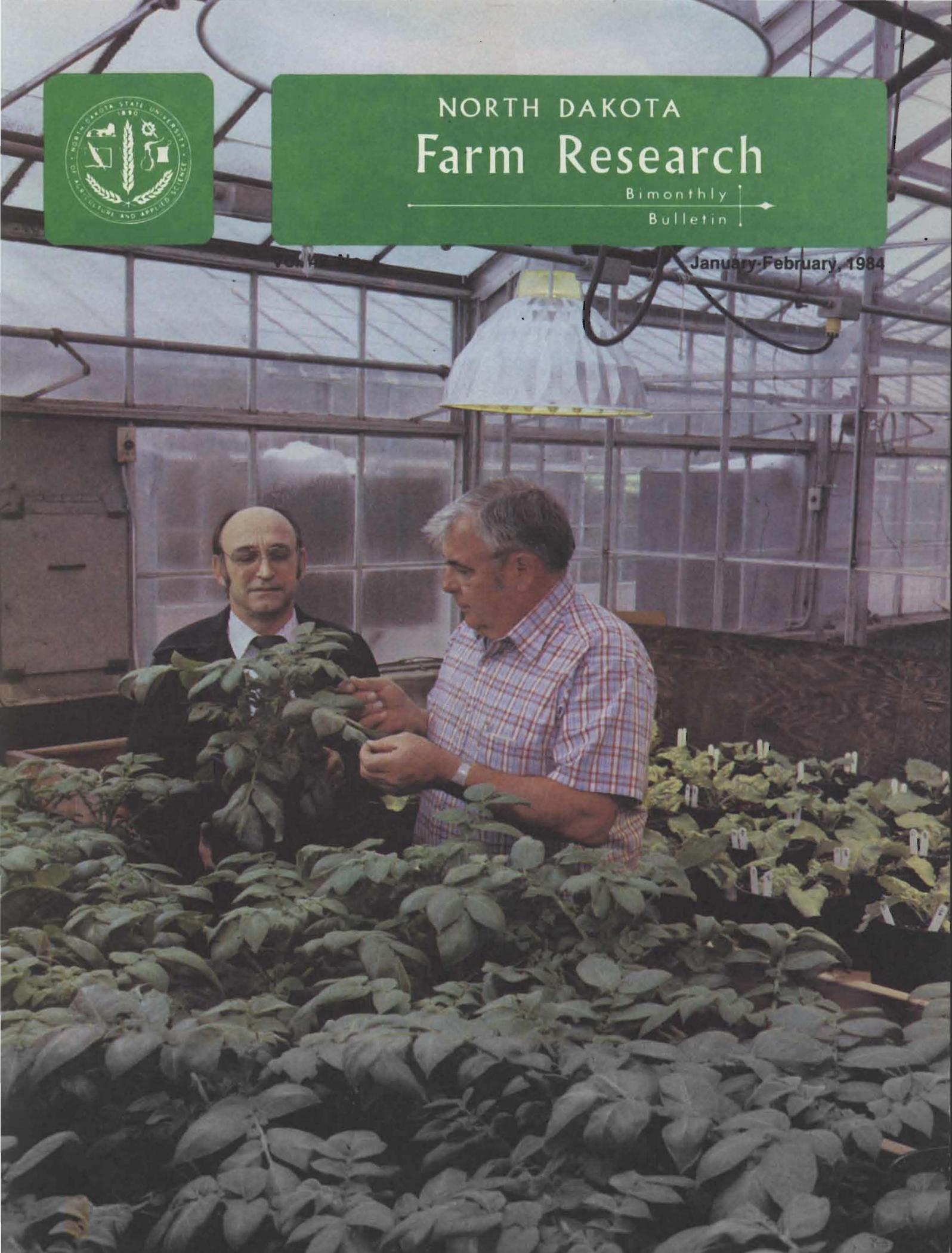




# NORTH DAKOTA Farm Research

Bimonthly  
Bulletin

January-February, 1984



## GUEST COLUMN

**Arthur A. Boe**  
Department of Horticulture



Horticultural science will be challenged in the 1980s and 1990s to incorporate rapidly developing new technologies into an already complex and sophisticated industry. The intensity of the production systems and value of the products involved should stimulate research on methods to increase the efficiency of these systems. Emphasis over the last several decades has been primarily on optimizing the environment of the plant by the use of pest control, proper nutrition and stress control, along with the selection of disease resistant and adapted cultivars.

It is thought, in some circles at least, that yield of many crop plants has reached a plateau and that further significant yield increases will not be accomplished by conventional techniques. New ways to increase the biological efficiency of plants are therefore being sought.

Biological efficiency could be modified in a number of ways. Of these, the possibility of engineering plants by manipulating their genetic make-up is receiving a lot of attention. Major breakthroughs in genetic engineering may be years away but we are already seeing the results of the process of developing a new technology.

The use of tissue culture has made possible the elimination of viruses, as well as the rapid multiplication of plant materials. The culture of developing pollen grains has made available plants with half the genetic component of the parent plant and, in the case of potatoes, made possible the combining of the genetics of wild species with the cultivated one. Culture of single protoplasts isolated from leaf tissue has shown that new more adapted or efficient plants could be developed in this manner. Quite possibly new varieties of the future will be created by fusing protoplasts from different plants to acquire desirable characteristics that could not be transferred using conventional breeding techniques.

The use of chemicals to modify the growth and development of plants has been practiced by the producers of pot plants. Relatively few uses for these materials (plant growth regulators) have been adopted in food crop production. The fruit industry uses plant growth regulators to increase the size of table grapes and bring apple trees into fruiting sooner. Compounds do exist that increase the tillering of cereal crops and

continued on page 11

## In This Issue

Downward Adjustment in Farmland Values Continued in 1983 <i>Jerome E. Johnson</i> .....	3
Trends in 1983 Farmland Rentals <i>Jerome E. Johnson</i> .....	9
Window Treatments for Energy Savings in a Cold Climate <i>James A. Lindley and Helen Lunde</i> .....	12
Roundworm Parasites of North Dakota Cattle <i>Myron F. Andrews and Mary Hanson</i> .....	19
Mental Health of North Dakota Farm and Ranch Women: What Makes a Difference? <i>Harriet Light, Doris Hertsgaard and Richard Hanson</i> .....	21
Quality of Lake Waters for Irrigation in North Dakota <i>Alexandru Maianu</i> .....	24
Annual Report, 1983 .....	26

### NORTH DAKOTA Farm Research Bimonthly Bulletin

Vol. 42, No. 4

January-February, 1984

**On the Cover:** Research in the plant sciences doesn't stop during the winter — it moves inside. Horticulture chairman Art Boe and potato researcher Bob Johansen inspect some plants in the greenhouse on a cold January day. Photo by James Berg.

A BIMONTHLY progress report published  
by the

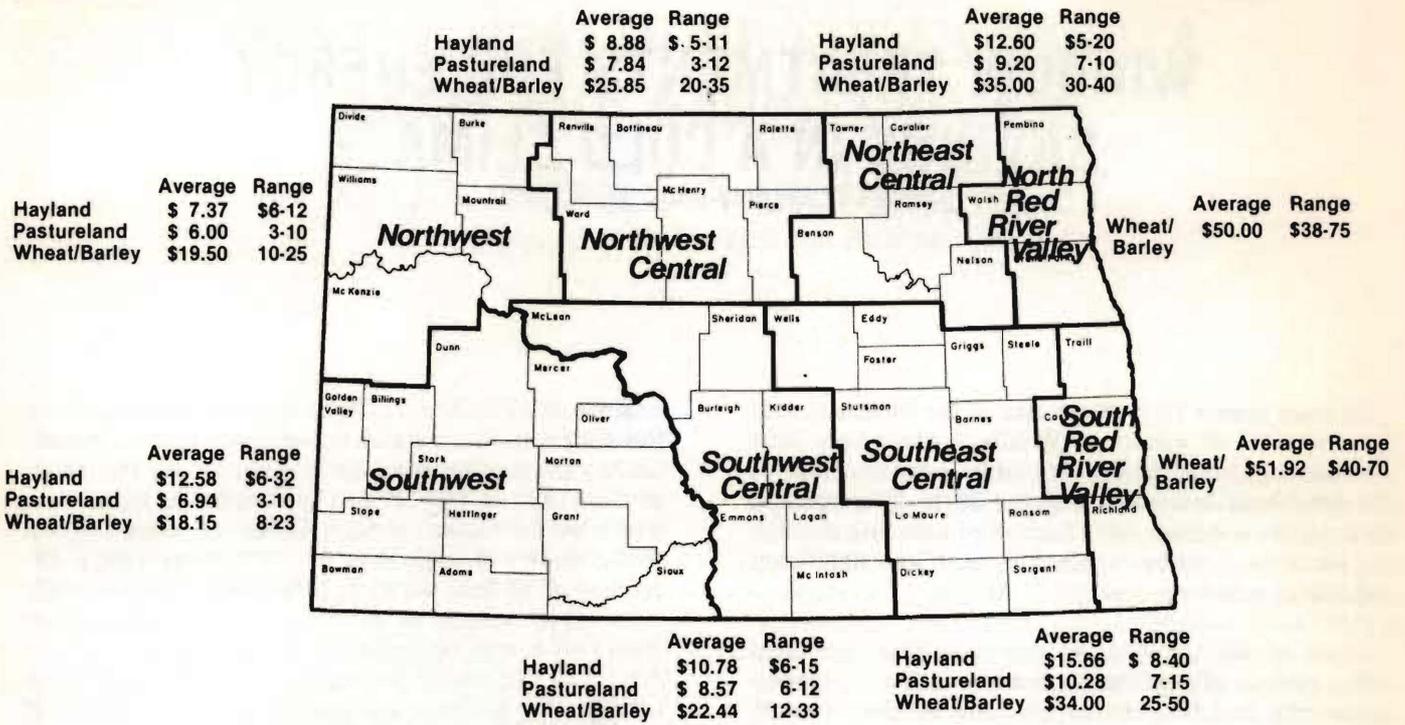
**Agricultural Experiment Station,  
North Dakota State University of  
Agriculture and Applied Science**  
Fargo, North Dakota 58105

**H. R. Lund**

*Dean of Agriculture, and Director  
of Agricultural Experiment Station*

**EDITOR**

*Gary Moran*



State: Hayland \$12.29, Pastureland \$8.65, Wheat/Barley \$31.00

Figure 3. Average Per Acre Cash Rents for Hayland, Pastureland, and Wheat/Barley Land in 1983 and Ranges in Estimates for Eight Farming Areas.

continued from page 1

thus increase yield. Some new plant growth regulators are being used to increase the yield of grass seed by shortening the plant and increasing tillering. Indications are that many plant processes such as photosynthesis, respiration, and partitioning of storage materials might be controlled by plant growth regulators and the plants made more efficient.

Research projects in the Department of Horticulture and Forestry involve increasing the biological efficiency of plants by breeding and selecting superior cultivars of potato, squash, tomato and certain ornamentals. Potatoes are being selected for such attributes as yield, storability, product quality and fresh market acceptance. A new project on tree improvement will develop

more adapted and pest resistant woody plants to be used in shelterbelt and ornamental plantings.

Studies on the physiology of the potato in relation to cultural procedures and environmental factors are a major endeavor. The landscape arboretum at Absaroka is a proving grounds for new woody ornamental plants for landscape plantings. Sugarbeet seed germination and establishment is a new project recently initiated as is a project on tissue culture of woody plants. These projects and future projects will emphasize increasing the biological efficiency of plants and the efficiency of production of plant products.

Agricultural Experiment Station  
NORTH DAKOTA STATE UNIVERSITY  
of Agriculture and Applied Science  
University Station  
Fargo, North Dakota 58105  
Publication

*H.R. Lund*

DIRECTOR

to

POSTAGE AND FEES PAID  
U.S. DEPARTMENT OF  
AGRICULTURE  
AGR 101



RANDY COON  
MORRILL  
AG ECON

BULK THIRD-CLASS