NORTH DAKOTA
Farm Research
Bimonthly Bulletin

Vol. 37, No. 1 July-August 1979

Guest Column

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Chairman
Plant Pathology

About one year before the North Dakota Legislature convenes for each biennial session, the several departments of the North Dakota Agricultural Experiment Station are called upon to provide statements on what they have done that is new and/or startling to justify their budgets. In the annual progress reviews of station projects and in the annual evaluation of faculty performance by the administration, the number of publications containing new, scientific contributions in refereed journals is used in part to measure the contributions of these projects or people to the agricultural research effort.

There are, however, many important activities which are carried out by personnel of this experiment station which are vital to the welfare of the citizens of North Dakota and the agricultural activities of the state but which are not new, startling, innovative or acceptable in refereed scientific journals. These activities are, in many cases, the every-day, required types of jobs which must be done to insure the general welfare of the agricultural activities of the state.

From the cooperative efforts of plant breeders, plant pathologists, cereal technologists and others may eventually emerge a better crop variety. Before this can happen, however, a great deal of effort and time has been spent on necessary jobs which will not get published in refereed journals, released as a variety or listed as new and innovative research. The plant breeder must first find the particular characteristics that are needed. Often there is more than one such character, for example, straw strength; kernel characteristics; oil quantity; oil quality; milling, baking or processing qualities; disease resistance etc., required in a single variety. These characters are often found in germ plasm that has very poor agronomic traits and would never make a commercial variety. These characters must then be transferred to a variety or plant type that has acceptable agronomic characteristics. Such transfers take time (months or years), and they may often be only partially successful, i.e., the character being transferred may be complex and only part of the desired trait is recovered as a result of the first cross. The process is then repeated to improve the character. The building of parental crop lines, therefore, takes a great deal of time, manpower, and facilities with no immediate direct benefit to the grower and nothing flashy to report. However, without these activities, no new crop varieties would be forthcoming.

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On the cover: Bees play an important role in sunflower production as pollinators. Conversely, sunflower is a source of quality honey, enhancing North Dakota's already high status as a honey producer.
Photo by James Berg

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Vol. 37, No. 1 **July-August 1979**

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

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North Dakota farmers have come to expect that disease problems in their crops will be solved with the appearance of disease resistant varieties. A great deal of success has been achieved in controlling some plant diseases with resistance in improved crop varieties. Stem and leaf rust of hard red spring wheat, spot and net blotches of barley, rust and downy mildew of sunflowers, and wilt and rust of flax no longer cause serious annual losses in crop production. However, the same genetic principles that are used in the improvement of crop varieties also function in the biology of the plant disease organisms. The genetic composition of plant disease organisms changes. This means that the crop variety which was immune to a disease five years ago may become susceptible to a new race today or tomorrow. Therefore, a constant collecting and testing of isolates of the plant disease microorganisms is continued to determine if there have been serious changes in their ability to attack North Dakota crops. Again, these activities require space, people and money. Without such a testing and surveying activity, the sudden failure of North Dakota crops because of their susceptibility to a plant disease organism will occur more frequently and unexpectedly.

When a gene which governs resistance in a crop variety suddenly is no longer effective in controlling a plant parasite, new genes for resistance must be found and identified. Genes which govern resistance in a crop variety are identified by checking the variety with tester races of a particular plant parasite or by making crosses or test-crosses with the crop variety and then testing the progeny with tester races. This work again involves considerable effort from the project personnel and requires time, space and money.

Many examples of activities which are not 'new' may be found within the research projects of your North Dakota Experiment Station. Some of these activities are also carried out by the Cooperative Extension Service personnel. An example of such an activity is the Plant Diagnostic Laboratory. In this case plant samples are sent to the Plant Diagnostic Laboratory by the county agents for identification of the plant, insect or disease. Information on the nature of the problem and its control is returned to the North Dakota citizen.

The personnel and financial resources as well as physical plant facilities of the North Dakota Agricultural Experiment Station are not limitless. Additional activities require an evaluation of ongoing programs. Such evaluations are brought about through annual reports and reviews of each project plus larger periodic reviews. There are external reviews of departments every three to four years. Although some projects are terminated upon their completion, others, such as the testing of crop breeders' advanced lines or the testing of isolates of plant parasites for virulence for disease resistance, must be continued if North Dakota agriculture is to be well served.

A recent trend of the Administration of the United States Government has been not to increase federal support for state experiment stations through the formula funding known as the Hatch Act. These Federal officials supported by educational factions both within and without the land grant universities would substitute grant funding to support specific and basic research in place of the present Hatch funding. Grant funds would be available only for certain

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specifically defined research areas. This effectively removes local control of research projects and makes the research effort less responsive to local needs. In this system growers and agribusiness input in advising the direction of our research efforts would be blunted if not stopped.

The grant system of funding agriculture research also decreases the amount of personnel and space which can and will be allotted to those every-day-type chores previously enumerated which a modern, progressive, scientific agriculture requires. The congressional delegation from North Dakota has resisted the change to grants in financial support of your North Dakota Experiment Station. They have strongly supported the Hatch type of funding. If the grant system is substituted for Hatch Act funding, serious reductions in the amounts of monies, space, personnel and facilities available to problem solving can be expected. Such reductions can only be overcome by the agricultural community assuming a greater financial responsibility for the cost of agricultural research.

Although the present Hatch system of funding may have faults and could be improved, the record of its research achievements over the years of its existence is outstanding. Agriculture in the United States remains strong. We feed ourselves well and still have supplies for hungry nations and international trade. Let us be careful in selecting a substitute system.