

# Horticulture — After 1990

Arthur A. Boe  
Department of Horticulture and Forestry

Looking down the road a few years is an exercise we usually participate in with ease. Longer looks make us nervous. We inherently like to look into the future with our feet in the past and our eyes in the present.

Horticulture and forestry at North Dakota State University has a history as old as the university. The first permanent faculty member at the NDAC was C. B. Waldron, who in 1891 was designated professor of horticulture and forestry. Twenty-seven professionals have been associated with the department over these past one hundred years. Eleven of these make up the faculty of the department today.

Basic to the research program in the Department of Horticulture and Forestry has been the continuous struggle with the harsh environment of the Dakota prairie. Species and varieties adapted to survival of the cold winters or able to mature in a relatively short growing season have been sought, developed or bred out of these necessities. Present endeavors in the department continue this tradition.

But, will North Dakota be as cold during the next one hundred years? Predictions are that it will not. Perhaps the greatest challenge for the future will be breeding and developing new crops and varieties for a changing climate.

Not only will our weather be warmer, but it will be drier, making it necessary to adapt our crop production systems to irrigation.

The Department of Horticulture and Forestry is, and will be, involved with a diversity of plant related research. There is a considerable emphasis in potato breeding and genetics and potato physiology and culture. Other row crops that are or could be studied include sugarbeets, large seeded legumes and small fruits.

A second area of emphasis has been in woody plants, both for windbreaks and shelterbelts and for ornamental purposes. These plants provide protection from the climate and aesthetically make the environments of our cities, parks and farmsteads a better place to live and work.

Most North Dakotans have ties to the soil, either presently or ancestrally. This makes gardening a popular recreational activity. The Department of Horticulture and Forestry services the home horticultural industry with research on variety development and cultural practices.

As a basic research component, the department is involved in research to delineate some of the mysteries of plant genetics. The means to manipulate the genetic characteristics of the plant or crop make it possible to continue developing those adapted cultivars necessary for successful crop production. Unraveling the secrets of a plant's genetic makeup will also make it possible to use new technologies for transferring exotic genes to new crops and varieties of the future.

Other more basic research on tissue culture for use in propagation and plant breeding is in progress, as are studies on plant growth and development and the relationship of environmental factors to overall crop productivity.

How will we look during the next one hundred years? The best bet is that there will be no dramatic changes. We'll ease into the future the way we have eased through the atomic age and the space age. The inherent need for certainty in science makes progress slow. There are, to be sure, some spurts of activity. Genetic engineering and biotechnology have caused such a spurt — one that will be developed into practical on-the-farm or backyard garden practices in the next one hundred years.

Getting down to some concrete thoughts on challenges and changes, either around the corner or in the next one hundred years, certainly the following come to mind:

**Potato Varieties.** Potato varieties developed in the next one hundred years will be resistant to most of the common insects, diseases and nematodes and will be more productive than present day varieties. They also will be able to be stored at lower temperatures, saving energy for heating storages and reconditioning from cold storage. New varieties will likely be for multiple use, i.e. baking, french fries and chips from the same variety.

**Potato Physiology and Culture.** Perhaps the greatest change in potato production will be increased use of irrigation. It is quite likely that a major portion of the potatoes produced in North Dakota will be irrigated either by Garrison Diversion or from wells.

Cultural practices will become less and less dependent on chemicals as resistant varieties are developed. Weed control may well be accomplished by chemicals using varieties that have been genetically engineered to be resistant to the herbicide.

North Dakota will likely become even more important as a potato producing state.

**Field Windbreaks and Farmstead Shelterbelts.** If indeed the climate in North Dakota becomes more arid, the use of field windbreaks will become more important. The management of tree plantings will become more intense with thought to developing stands that will not only serve the usual purposes of conservation and protection, but will also serve as an income source for the farmer.

The production of sawlogs from plantation stands of oak, walnut and elm may well become the only source of these hardwoods. Managed windbreaks of poplars could become a source of fuelwood and rough lumber. Pines planted on a rotation plan could supply Christmas trees and poles.

Seedling trees for future windbreaks and shelterbelts will be produced from seed from seed orchards made up of superior strains that are known to produce vigorous, fast-growing, productive trees. Future trees could also be produced in tissue culture from known supertrees that are superior for a particular use. They also may be genetically engineered for resistance to disease, insects or environmental stress factors. Certainly we will have trees more in tune to the conditions of their use.

**Ornamental Plants.** As North Dakota emerges into its second century and the nation into its third, the value of a more aesthetically pleasing world is apparent. There have probably been more arboreta and botanical gardens started in the U.S. in the last 20 years than in all the history of our

country. This trend will continue. Not only are these areas interesting, but they are necessary for a mature and growing population.

The urban forest that makes up our cities and suburbs will continue to receive emphasis. These parks and boulevards present a whole new set of problems requiring research. This is a valuable asset and its necessity will become more apparent as time passes.

Ornamental plants involve not only the plants and man but the interaction of man with the plants and man's relationship to his environment. Thus, the research involves not only plants, but also the interactions of plants and man and how they live together in the twenty-first century.

**Home Horticulture.** The number one recreational activity in the United States is gardening. North Dakotans are not an exception to this. Home vegetable gardening will continue as a hobby and a means of providing high quality produce. As the new technologies and genetic engineering are used to better commercial crop production, the home gardener will also benefit.

The older cultures in Europe and Asia foster the hobby of plant culture for both food and beauty. It is to be expected that this will also be true in the United States. Much as interest has increased in public gardens, home gardening holds a fascination for many people. This will increase. With both an increase in popularity and population, research to service the home horticulturist will provide many challenges in the future.

---

**Continued from page 24**

Systems for utilizing on board computers are being developed to optimize tractor performance. A series of sensors can be used to measure factors such as fuel consumption, power requirements, and ground speed. Continuously variable transmissions may be incorporated into tractors to facilitate computer control based on sensor input. Fuel efficiency is a major variable that may be controlled in this way, but the system could be adjusted for other factors such as maximum work rate in emergency situations. Sensors and computer control systems are commonplace in today's automobiles, tractors and farm implements. Expanding these uses is likely to replace much of the manual control equipment still in use.

New engineering technologies that may adapt to agricultural production and the processing of agricultural commodities are continually being developed. Some may be utilized in ways that will improve the competitiveness and safety of agriculture while others may not. These technologies must be considered as potential improvements for economic production and use of agricultural products. Agricultural engineers can evaluate and incorporate appropriate options in ways that will help make North Dakota agriculture competitive in the World.