

RESEARCH OF USDA SUGARBEET INVESTIGATIONS
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Research of the USDA Sugarbeet Investigations is located largely in the major areas of production. The work at all locations is cooperative with the State Experiment Stations and the sugarbeet industry. The major objective is to develop basic breeding stocks with improved resistance to pests, better yield, and quality.

One center of such research, Beltsville, Maryland, not located in a sugarbeet producing area, is directed to the problem of leaf spot. These studies, which are supported by the industry, are directed to develop breeding stocks with resistance to Cercospora beticola. The research is conducted at Beltsville because of the excellent disease epidemics that can be made to occur.

The program at East Lansing, Michigan has effectively served the Great Lakes production region. The staff is comprised of a geneticist, pathologist, and physiologist. A substantial portion of the work has been devoted to the conversion of varieties from the multi- to the monogerm state. This complex problem takes into account disease resistance, quality, bolting, yield, and all the other factors essential for acceptability as a basic breeding stock.

The monogerm trait and attendant space planting techniques imposes new demands on germination and establishment of stand. Studies pertaining to these problems are underway on the genetics, pathology, and physiology of seed germination and seedling growth. These studies have importance not only to the Great Lakes region but to other areas of the humid east where the sugarbeet is produced.

Substantial changes took place in a program located for many years at St. Paul, Minnesota. The industry moved from Southern Minnesota and has now concentrated and expanded in the Red River Valley. There is intense grower-processor interest in the prospects for increased production of sugar in the valley.

The Sugarbeet Investigations program at St. Paul was revised and transferred to Fargo, North Dakota Agricultural Experiment Station. A plant physiologist has been added to the staff. He will join a plant pathologist in a combined study of production practices as they relate to storage of the sugarbeet and loss of sugar. The insidious loss of sugar from beets while in the storage pile affects producers and processors. The scientists will seek varieties, cultural practices, and treatments to retard sugar loss.

One of the current highlights of our sugarbeet research activities is taking place at Ft. Collins, Colorado. A new one-million dollar Crops Research Laboratory was constructed. One half of this laboratory will be utilized for sugarbeet research. This will be a great improvement over the reconstructed quonset huts that previously provided office and laboratory space.

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The ARS sugarbeet staff at Ft. Collins consists of a plant pathologist, two geneticists and a chemist. Their research encompasses such difficult problems as genetic control over multiple-factor characters. New studies concerning physiological genetics are underway. They seek to control specific biochemical reactions through plant breeding. The plant pathologist has made remarkable strides in our knowledge about Rhizoctonia. Techniques have been developed that will provide for controlled evaluation of parasitism. This is an important step in the development of resistant varieties.

One of the very interesting projects that involves all of the staff and State scientists is the study of the chemical factors that control leaf spot parasitism. This basic research has defined particular chemicals that exert control. The practical importance of this for developing disease resistant varieties is self-evident.

Sugarbeet Investigations in the Intermountain States is located at the Crops Research Laboratory, Logan, Utah. The history of this activity goes back to the research at Salt Lake City conducted by Dr. F. V. Owen. His studies on male sterility of the sugarbeet were the basis of present day commercial hybrid sugarbeet varieties.

The staff at Logan is comprised of a geneticist, histologist, pathologist, and physiologist. Penetrating studies are underway by the geneticist on the nature of cytoplasmic male sterility. These basic studies hopefully will lead to development of improved genetic procedures. Substantial assistance to this work has been provided by the addition of histological studies.

New strains of curly top and the need for basic studies on the virus occupy the time of the pathologist. Plant viruses mutate in nature and we are aware of strains that can infect varieties that are considered resistant to the common strains of the disease. Curly top is a dangerous pathogen that deserves an intensive research effort.

Salinas, California is the site of a major sugarbeet research station. The scientists are studying difficult problems; nematode resistance, virus yellows and interspecific crossing.

The staff at Salinas is comprised of nine professionals. The most recent achievement is the release of several varieties of sugarbeet that are tolerant to virus yellows. When grown under conditions of moderate to heavy infection, they will produce 24 to 26 percent more sugar than commercial varieties. The new developments in interspecific crossing for resistance to nematodes are promising. We are confident that control of nematodes through resistant varieties will in some future day be a fact.

The research on sugarbeet diseases at Salinas is world renown. Basic and applied information from this program has been the basis for research to develop resistant varieties. The teamwork of the geneticist and pathologist is basic to practical control of plant pests.

An extensive program of sugarbeet research is underway through contracts. Eleven such projects are in effect throughout the country. A good example is a project in Michigan with Professor Dexter on the effects of cultural practices, varieties and storage on quality of the sugarbeet. Another is being established with Professor C. W. Hall on the effects of varieties, cultural and storage practices on spoilage and quality deterioration of stored beets.

The large domestic contracting program is complimented by foreign contracts through P. L. 480. Two contracts on yellow wilt and tetraploidy were recently completed in Chili and Spain. A contract on strains of leaf spot in Israel will terminate in August 1969. A project is also underway in Poland on interspecific hybrids.

Recent legislation has caused problems with our sugarbeet program. The limit on employment of Federal employees is a current difficulty. Our mission, however, has not changed. Our responsibility is to work with State and industry scientists to reduce the hazards of producing the sugarbeet, increase efficiency and improve quality. We appreciate the opportunity to cooperate with you in these endeavors.