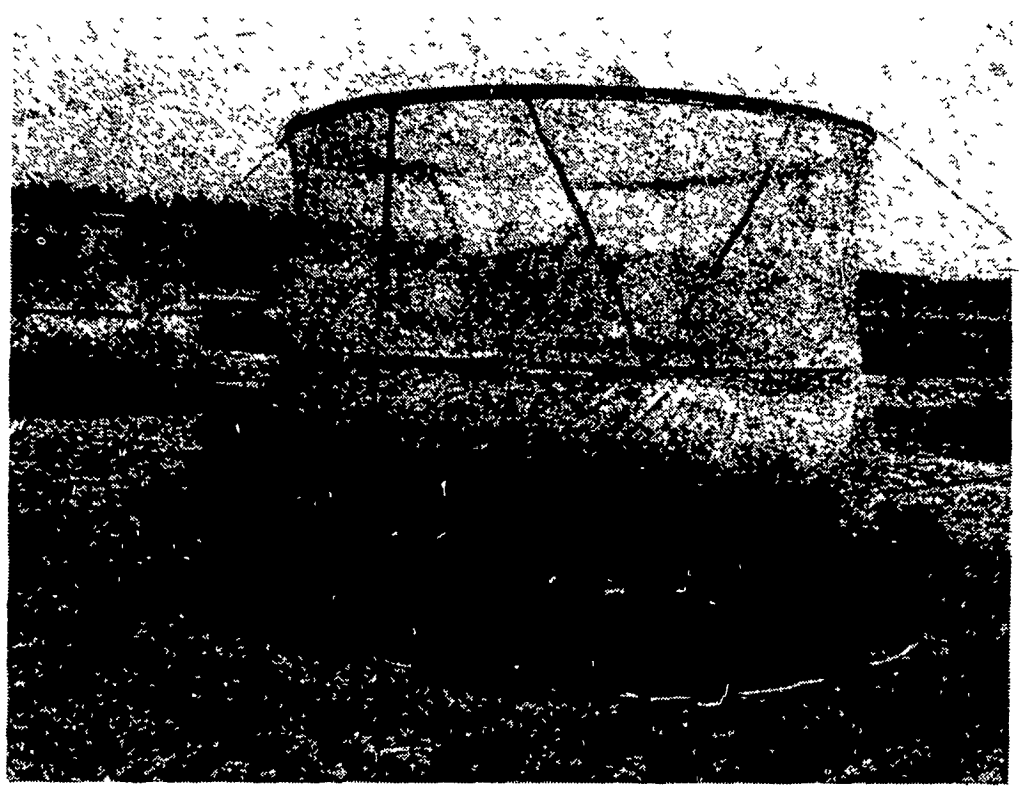
Air pollution's effects on plants studied

NEWARK, Del. -- Scientists at the Delaware Agricultural Experiment Station are part of a regional attack on a global problem: the devastating effects of air pollution on crops.

According to Dr. Donald J. Fieldhouse, an Experiment Station researcher from the University of Delaware's Department of Plant Science, the main source of pollution in the Northeast is the automobile. Ultraviolet light from the sun changes the exhaust fumes from cars, as well as from certain factories, into ozone. In small quantities, Fieldhouse says, ozone is beneficial; it is actually used to purify air. The substance has a sweet, clean smell. However, when ozone is present in quantities large enough to be detected by the human nose, it's actually harmful to health.



Watermelons grown in these huge growth chambers thrive better if the air is charcoal-filtered against ozone. The project is part of Delaware Agricultural Experiment Station's contribution to regional air pollution research.

According to Dr. Fieldhouse, whose specialty is air pollution, ozone becomes dangerous when it is present in the air at the level of five parts per hundred million. It can be smelled by humans at 10 parts per hundred million. On a still summer day in rural Delaware, the ozone count is frequently 15 parts per hundred million. Closer to cities and in Southern California, the count is routinely much higher.

Ozone breaks down membranes, Fieldhouse explains, not only in the noses and throats of humans and animals, but also in the cells of plants. Plants, of course, include food crops – one of the Experiment Station's particular areas of study.

Air pollution research at Delaware was designed to find out which crops are most hurt by ozone. In one phase of the study, ozone-susceptible and resistant varieties of potato and watermelon were compared in terms of yield and amount of ozone damage.

In a second phase, watermelons were grown in huge, open-to-the-sky growth chambers - cylindrical tanks without lids. For experimental purposes, some of the chambers contained charcoal filters, others did not. Since charcoal effectively filters out ozone, the experiment demonstrated that the plants in the filtered air thrived better because the effects of ozone were minimized. This offered further proof that ozone was the damaging factor on the control plants.

Other findings thus far include the fact that ozone is especially damaging to plants with mature leaves, and to plants which have been well-watered. Injury is lessened if plants have been well-fertilized with nitrogen. Ozone damage is evidenced by white flecking or black spots on leaves, depending upon the crop.

In the third phase of the study, beginning this year, research will involve growth tests with a promising experimental chemical. Experiment Station researchers and E. I. du Pont de Nemours and Co. scientists have been collaborating for four years on a chemical which has already been shown to eliminate ozone damage. The remaining question is economic: how much better yield would farmers reap if they were to add the chemical to their arsenal of agricultural chemicals? The significance of yield differences demonstrated in Experiment Station research will help the Du Pont Company determine whether it would be profitable to make the chemical commercially available.

Delaware research is one part of a larger effort, the Northeast Regional Air Pollution Project chaired by University of Delaware Department of Plant Science Chairperson, Dr. Charles R. Curtis. Scientists from other states in the region as well as Canada are conducting research on various other aspects of the vast air pollution problem. For example, Penn State scientists are examining the effects of ozone on the food quality of alfalfa, potatoes, and soybeans.

Even though the air pollution project is nominally limited to the Northeast Region, in actual fact some of the participating states are as far away as Wisconsin and California. This is not as strange as it may seem, Curtis explains, since air pollution can travel hundreds of miles in the upper atmosphere. Even though the problem is especially severe in the industrialized, heavily populated Northeast, practically no farm anywhere in the country is so remote as to be completely immune to the problem.

The regional effort has been progressing for almost ten years. Base-line air quality data was established for the region during the first five years through a regional monitoring network. The second five years were used to expand knowledge of, and quantify, the negative impact of pollutants on the growth and productivity of many kinds of plants.

Over these ten years the problem has been clearly defined, but the project is far from over. The next five years will be devoted to acquiring new knowledge and methods to reduce the influence of air pollution on plant productivity. The new data will help develop needed solutions to the air pollution problem.

In the face of ever-deteriorating air quality, the scientists involved in the Northeast Regional Air Pollution Project will be challenged to find new chemicals and pollution-resistant plants to continue to feed the world's population.

Grange plans youth camp

HARRISBURG – The Pennsylvania State Grange will be holding the 26th annual State Grange youth camp at Camp Kanesatake from July 14 to 16.

Doug Bonsall, chairman of the State Grange youth committee, expects approximately 150 people to attend this outing in Huntingdon County.

Highlights of the program include the selection and coronation of the State Grange youth prince and princess.

Selection of royalty is based on the results of a written test on Grange issues and ritual.

The two winners of this contest will reign for one year before representing Pennsylvania at the National Convention in Lancaster next year.

The 1978 National Grange youth prince and princess are both from Pennsylvania. They are John Keith, of Entriken, and Anna May Snyder of Camp Hill.

Barbecue set

LEWISBERRY – The annual chicken barbecue of Valley Grange, No. 1360, will be held Saturday, July 8, from 4 to 8 p.m. at the Grange Hall on Market Street.

The event is open to the public, according to David M. Scott, master of Valley Grange. William K. Traver is chairman of the barbecue committee.