

Researcher Explains Need For Greenhouse Engineering

Interest in improved mechanization for greenhouses and plant nurseries is increasing steadily, due largely to increased costs for labor and production, says Dr. Sverker P. E. Persson, associate professor of agricultural engineering at The Pennsylvania State University.

Dr. Persson discussed engineering opportunities during the annual meeting of the North Atlantic Region, American Society of Agricultural Engineers, held recently at College Park, Md.

Achievements may come from several kinds of engineering, he suggested. Implement and equipment designers are needed for many areas of greenhouse and plant nursery mechanization. Development of instrumentation for environmental control is a wide open field.

Systems engineers and industrial engineers can point out the best combinations of facilities and resources, including the most efficient locations for different stages of the process and the equipment. Such developments make the manual work easier.

Dr. Persson indicated such engineering is of special interest in the Northeast where closeness to large centers of population offers advantages to greenhouse operators and plant nurserymen. The advantages include low costs for transportation and minimum time to ship perishable items—both vital factors, he affirmed.

Stressing the size of greenhouse operations in the east, he said Pennsylvania, New

York, and Ohio are second, third, and fourth, respectively, among the states in floor space in greenhouses. The greenhouse and plant nursery industries include production of bedding plants, potted plants, cut flowers, and nursery stock.

He indicated considerable engineering and technology have already been applied to controlling plant environments in greenhouses. Sophisticated control systems predict the requirements of a particular plant, establish the naturally available amounts of the environmental factors, and compensate for the difference. This means providing correct temperature, humidity, air velocity, radiation, and chemical content of the atmosphere.

Improved soil preparation could use better equipment for getting the soil mixed with the proper ingredients, he observed. Designing suitable plant containers and filling them with soil is another area for mechanization. Soil handling systems are needed rather than individual soil handling machines.

In some cases, containers can be eliminated. Machines are available which make soil cubes needing no containers. Dr. Persson said an intensive search is underway to find and develop biodegradable containers for potted plants.

Growing plants without soil is attracting increased interest. A growing medium for geraniums is made of specially treated paper pulp. Cucumbers are

grown on mats of rockwool instead of soil.

From the engineering standpoint, such new growing mediums require systematic

Time to Prevent Farm Equipment Highway Accidents

By Jay W. Irwin
Associate County Agent

As daylight hours grow shorter, farmers will be moving more farm machinery on highways during semi-dark or dark hours.

Slow moving farm vehicles traveling on highways present a real traffic hazard. The motorist must recognize that a tractor traveling 5 to 10 miles per hour is practically standing still compared to a 50-m.p.h. automobile. Most highway drivers have never driven a farm machine on the highway and simply do not comprehend how slowly they do travel.

Proper identification and warning is of utmost importance. The triangular Slow Moving Vehicle emblem must be used with all farm equipment operated on highways.

Keep alert, during the fall harvest and planting season, for slow moving vehicles on the highways. And be sure your farm machinery is equipped with an SMV emblem before it's moved onto any highway.

studies of moisture holding capacity, moisture transfer, heat transfer, aeration, diffusion properties, resistance to growing, and the strength of the medium.

As for planting the seeds, a pneumatic seeder has been built that can handle 96 individual flower seeds at a time. When the seeds are too small or too irregular for precision planting, pelleting of seeds has been tried and is used to some extent, especially in Europe.

Mechanization of the transplanting operation is under study at Penn State and elsewhere, he pointed out. Results indicate that about half the normal transplanting time is used to separate seedlings from each other. The other half is spent in putting seedlings into new containers.

Penn State scientists are experimenting with seedling plants grown individually in small soil cubes. The cubes are mechanically transplanted into larger containers at the proper stage of development.

A wide variety of mechanical systems are already in use for watering plants. One type spreads a mist of water over the plants. There is also a system wherein each individual plant has a small plastic hose supplying water as needed.

Watering is sometimes automatically controlled, for example, by the weight of the pot and plant, or by the effect of incoming radiation.

Mechanization is also helping with the task of pulling shade cloth over plants to increase the length of the dark period, thereby promoting flowering.

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