

# CCEA Newsletter

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CCEA is a research organization dedicated to the improvement and vitality of the Controlled Environment Agriculture Industry. CCEA is funded by Industrial and Grower Partners who contribute a yearly partnership fee. Satellite partnership is available to growers for a modest fee. Information on CCEA is available from:

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## Greenhouse Update

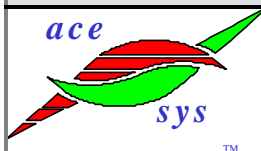
The research greenhouse pictured below has been erected and covered. Currently data is being taken on its performance as we are assembling the computer control system to install it.

Four gear-driven motors control the roof sections through a controller which uses limit switches to determine fully open and closed roof positions. The Argus computer system will give various openings depending upon temperatures during normal operation based on desired temperature settings for the

particular crop.

Temperature data is present on several graphs in this newsletter. The fan ventilated greenhouse is illustrated on page 2. This greenhouse had limited crop growing area and was not shaded. We could expect to lower the temperature 6-8°F with a 50% shade.

In most cases the temperature at the 4 foot level is within 2-4°F of outside temperatures and the temperature in the fan ventilated greenhouse is at least 15°F higher than outside temperature. There is limited



## Vision Statement

CCEA, The Center for Controlled Environment Agriculture of NJAES of Rutgers University, a partnership among growers, industry and researchers, will devote itself to research and transferring information required for an economically viable and environmentally aware controlled environment agriculture industry. We will particularly strive to identify future trends, critical issues, appropriate emerging technologies and provide leadership for opportunities which challenge world-wide controlled environment agriculture in the 21st century.



Photo taken by Roberts June 11, 1999

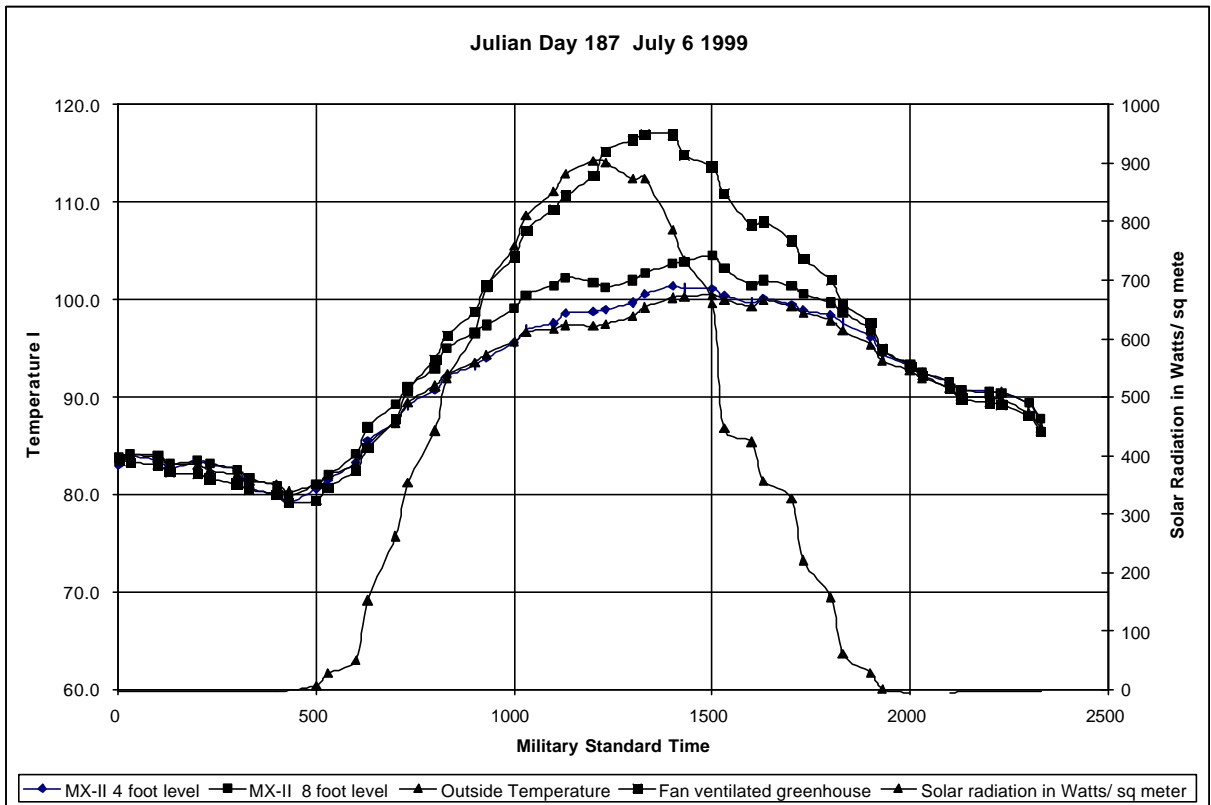


Figure 1. Data taken on July 6, 1999.



Fan ventilated greenhouse located next to MX-II

The data in Figure 1 indicates that the outside temperature and the temperature at the 4' level in the greenhouse track very closely and about 2°F apart. The fan ventilated greenhouse reached 115°F when the outside temperature was 100°F and the MX-II was about 102°F. Without shading it is impossible to cool greenhouses and with shading it could be expected to reduce the temperature to 110°F in the fan

**Editor presents Open Roof Scenario**  
 ASAE is meeting in joint session with CSAE in Toronto in early July and your editor will be presenting a paper on the open roof greenhouse project. He will

also present a paper at NABEC, the North Atlantic Agricultural Biological Engineering Conference in Lancaster PA which is meeting August 1 to August 4.





View showing the clear sky through the roof on June 11, 1999



View showing the direct light available in part of the area.

### Opportunities

The two photos indicate some opportunities for improved growing conditions in open roof greenhouse designs. The large roof opening provides opportunity for excellent cooling in hot weather. This expands the opportunity for producing crops which require cool temperature in a longer time frame.

The lower photo shows the potential impact of having crops growing in direct sunlight during part of the day. This greenhouse is oriented North to South so the shadow patterns move throughout the day. Your editor has observed crops in open roof greenhouses growing in direct sunlight in temperatures 10°F lower than an adjacent greenhouse which was shaded with a 50% material. This greenhouse was running at a temperature 10°F higher than the open roof greenhouse with one half of the light available because shading is

### Challenges

There are several obvious challenges to the open roof design. Insect control is one which will need to be investigated. Screening would reduce the efficiency of the

cooling system.

Another problem is that direct sun might not be appropriate for some crops although some growers install thermal screens in the greenhouse for energy conservation in the winter and shading in the summer.

### **Baton Passes to Giacomelli**

Dr Gene Giacomelli will assume leadership of CCEA at the ACE-SYS III conference. The ceremonial passing of the baton will take place during the annual CCEA meeting being held in conjunction with the Symposium.

Gene is no stranger to CCEA Partners and Scientific Advisory Board members. He has been active in CCEA and has produced two highly successful workshops over the last year and is the prime mover with Dr. KC Ting of ACE-SYS III. As Director, Gene will assume duties of day to day operations of CCEA and be responsible for its long range vision and mission.

Gene and KC had the original vision for ACE-SYS I held in July 1994 in New Brunswick, NJ. ACE-SYS II was planned by Dr. Tadashi Takakura and held in August, 1996 in Yokohama, Japan.

I will continue for a short time as Editor of the CCEA Newsletter and assist Gene in minor administrative and operational duties.

### **Nieswand Assumes Chair**

Dr George Nieswand recently became chair of the Bioresource Engineering Department. He replaces Dr. KC Ting who served for 6 years and has returned to the faculty to continue his noteworthy and world acclaimed research and teaching duties.

George Nieswand graduated from the Agricultural Engineering program many years ago and has invested most of his career at Cook in the Department of Environmental Resources. He has served as Dean of Cook College and is noted for his intense and brilliant mind. We eagerly look forward to his leadership and wit.

### **Roberts Hangs it Up**

After 41 years on the faculty, I'm retiring. I came to Rutgers as a student 50 years ago and except for two years in the military service I have been here at Rutgers University. As difficult as it is to believe these numbers the time has come to let younger minds and energies carry on the important work of supporting food, fiber and horticultural production, particularly in controlled environment agriculture applications. I'm confident that our faculty and staff will carry on this very important and timely program. I will continue on until the end of the year and into early next year in a modest consulting role. During this time I hope to carry on some of the research activity of our new open-roof greenhouse, continue as editor of the Horticultural Engineering Newsletter and conduct our annual Greenhouse Design and Environmental Control Short Course to be held on January 10 -11, 2000 and help acclimate the new Horticultural Engineer..

There is not enough ink in the cartridge to adequately thank all those who have made this enjoyable and challenging career possible. Dottie, my wife is at the head of the list. For 45 years she has been a faithful encourager and one who has held me accountable. Ruth Novak, a trusted colleague and friend has been of inestimable help to me. She has kept me from large pitfalls and helped me out when I couldn't avoid them. Many have commented over the years, don't let Ruth slip away. She is always friendly and unquestionably most helpful in answering our questions and supplying the necessary information.

Thanks to all. I have enjoyed the trip and look forward to God's continued blessing in the new challenges of retirement.

Bill Roberts