

# Horticultural Engineering

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Website: [www.cook.rutgers.edu/~roberts/](http://www.cook.rutgers.edu/~roberts/)

## Greenhouse Grower Meeting

### Floriculture In the Global Village

*Where do we fit into the  
picture?*

Cook College Campus Center,  
Rutgers University  
November 5, 1998



This program will feature **Ms Leslie Barlow**, of Barlow Greenhouses, who will discuss how they handle marketing in their family business. Another featured speaker will be **Bill Miller**, Director of Publishing at Greenhouse Grower Magazine who will discuss the implications of the consolidation and acquisitions occurring in the greenhouse industry. **Jim Willmott**, County Agricultural Agent, will give a pest management update. **Dr George Wulster** and **Dr Robin Brumfield**, Extension Specialists at Cook College, will discuss important topics in their area of expertise. **Hank Bukowski**, head grower at Kube Pak Corporation, will discuss the use of soil amendments which protect root growth and **Karen Kritz**, of the New Jersey Department of Agriculture will bring an update on the recycling of greenhouse films. Other important topics of interest will be presented by **Ralph Freeman** and **Dr. Harry Janes**. Professor **Bill Roberts** will review the revolution going on in open roof greenhouse design.

### *What are the Benefits of Attending This Conference?*

- Meet Extension Specialists in floriculture, entomology, economics, engineering and greenhouse management and learn the latest information pertinent to their areas of expertise.
- Enjoy the company of growers, fellow-managers, greenhouse staff and industry representatives working diligently to discover our place in the future Global Village of Floriculture.
- Learn the new technology surrounding open air greenhouses with movable roof sections..
- Visit the trade show and meet the people serving the industry.
- *Pesticide Recertification credits will be awarded.*

### The Trade Show

The trade show will feature many exhibitors returning from last year's successful show. There will be opportunity at various times throughout the program to visit the trade show, which is located adjacent to the meeting room. There will be time to discuss needs with the representatives of the many companies who will be exhibiting. We anticipate 15 exhibitors will be joining the show.

**Grower Program**  
**Floriculture In the Global Village**  
*Where do we fit into the picture?*

Cook College Campus Center, Rutgers University  
November 5, 1998

8:30 AM Registration and visit trade show

**Morning Session:** Professor Bill Roberts, Director CCEA Presiding

9:00 AM **Welcome** Dr Peter Day Interim Director NJAES, Cook College

9:15 AM **Using Florel to Control Height and Branching  
of Yellow and Apricot ‘Seashell Impatiens’**  
Dr George Wulster

9:45 AM **What’s New in The NJ NSCORT Project**  
Dr Harry Janes

**10:15 AM Break Visit the Trade Show Exhibits**

10:45 AM **Greenhouse Acquisitions/Consolidation Good or Bad for the Industry??**  
Mr William J. Miller II Publishing Director, Greenhouse Grower Magazine.

11:45 AM **Greenhouse Film Recycling Update**  
Ms Karen Kritz New Jersey Department of Agriculture

12:05 PM **Lunch**

**Afternoon Session** Ms Charlene Costaris Agricultural Agent, Atlantic County Presiding

1:15 PM **Should I Purchase or Lease New Equipment or do it By Hand?**  
Dr. Robin Brumfield

1:45 PM **How We Market Product and Promote Sales at Barlow’s**  
Ms Leslie Barlow

2:30 PM **Insect and Pest Management Update**  
Mr. Jim Willmott

3:00 PM **Break Visit the Trade Show Exhibits**

3:15 PM **Root Shield, Benefits and Management**  
Mr. Hank Bukowski Head Grower Kube Pak Inc

3:45 PM **Growth Regulators and their Effects on Crops**  
Mr. Ralph Freeman

4:15 **Open Roof Greenhouse Design Scenario**  
Prof. Bill Roberts

4:35 PM ***Adjourn Have a safe trip home!***

## Program Speakers

**Ms Leslie Barlow** Barlow Greenhouses  
Sea Girt, NJ

**Dr. Robin Brumfield** Specialist in Environmental Economics Cook College

**Mr. Hank Bukowski** Head Grower, Kube Pak Inc Allentown, NJ

**Ms Charlene Costaris** County Agricultural Agent, Atlantic County, NJ

**Dr Peter Day** Interim Director NJAES, George H. Cook College, Rutgers Univ

**Mr. Ralph Freeman.** Extension Educator, Floriculture Cornell University Riverhead, NY

**Dr. Harry Janes** Director EcoCenter, Director NJNSCORT Project Cook College,

**Ms Karen Kritz** New Jersey Department of Agriculture, Trenton, NJ

**Mr William J. Miller II** Director of Publishing, Greenhouse Grower Magazine

**Professor Bill Roberts** Specialist in Biore-source Engineering and Director CCEA

**Mr Jim Willmott** County Agricultural Agent, Camden County, NJ

**Dr. George Wulster** Extension Specialist in Floriculture, Cook College

## SPEAKER INFORMATION

### Faculty Coordinator

**Professor Bill Roberts** is Director of CCEA, the Center of Excellence for Controlled Environment Agriculture, Extension Specialist in Bioresource Engineering, George H. Cook College, Rutgers University with over 35 years experience in greenhouse design.

### Profile of Participants:

**Ms Leslie Barlow** is co-owner with Steve Barlow of Barlow Greenhouses, Sea Girt, NJ

**Dr. Robin Brumfield** is Extension Specialist in Economics and Marketing at George H. Cook College, Rutgers University and has an excellent program in marketing and accounting throughout the state.

## **Speakers cont**

**Mr. Hank Bukowski** Head Grower, Kube Pak Inc Allentown, NJ, leads production in 14 acres of greenhouses producing bedding plants and annuals.

**Dr. Peter Day** Interim Director of New Jersey Agricultural Experiment Station Cook College, Rutgers University. Dr Day is Director of the BioTech Center at Cook College and has a distinguished career in Biotechnology in the United States and Great Britain.

**Ms Charlene Costaris** County Agricultural Agent, Atlantic County, NJ who is active in the South Jersey Flower Growers Assoc.

**Mr. Ralph Freeman.** Extension Educator, Floriculture Cornell Univ. Riverhead NY Ralph has extensive experience in floriculture and is recognized nationwide.

**Dr. Harry Janes** Director EcoCenter Director NJNSCORT Project Cook College, Dr Janes has an exciting story to tell about the NASA space project.

**Ms Karen Kritz** New Jersey Department of Agriculture, Trenton, NJ leads a very effective program in agricultural development

**Mr William J. Miller II** Director of Publishing with Greenhouse Grower Magazine, one of the outstanding magazines and publishing houses serving the floriculture industry very effectively. Brings to us valuable information on the acquisitions and consolidations going on in our industry.

**Mr Jim Willmott** County Agricultural Agent, Camden County, NJ Jim brings experience from New York State and Pennsylvania to New Jersey Agriculture.

**Dr. George Wulster** is Extension Specialist in Floriculture, George H. Cook College and is well-known to New Jersey growers for his expertise and experience in commercial floriculture. George has recently developed an excellent website on the internet for the greenhouse industry.

## **GREENHOUSE COVERING RADIATION TRANSMISSION WORKSHOP**

October 1 & 2, 1998 [noon to noon]  
Hilton Hotel, Route 18, East Brunswick, NJ

The major companies in the greenhouse glazing and covering industry, greenhouse suppliers & manufacturers, their distributors & salespeople are invited to a workshop which will focus on solar radiation within the greenhouse environment, and the primary effects of the greenhouse covering on the light and heat environment of the crop, as well as, procedures and instrumentation for determining and interpreting glazing transmission. The registration cost of \$550 includes: Pre-workshop study guide, Notebook of lecture outline and notes, Pre-workshop product film test results [optional], Breaks and group dinner. *Workshop will be limited to 30 attendees representing the greenhouse glazing industry and CCEA Partners and Advisory Boards.*

**Registration information is available at**  
**<http://aesop.rutgers.edu/~ccea>**  
**or call Tel 732 932 9753**  
***....and now the complete details....***

### ***A WORKSHOP ON GREENHOUSE LIGHT TRANSMISSION***

#### **GREENHOUSE COVERING RADIATION TRANSMISSION WORKSHOP**

October 1 & 2, 1998 [noon to noon]

Hilton Hotel, Route 18 at exit 9 on the New Jersey Turnpike, East Brunswick, New Jersey. **(for Hotel reservations call 732 828 2000 and indicate you will be attending the workshop.)**

Light transmission in greenhouses! It is a complex topic. There are numerous conclusive studies and many commercial advertisements. Light transmission is difficult to measure, and a challenge to understand.

**WHO SHOULD ATTEND?** The major companies in the greenhouse covering industry, greenhouse suppliers & manufacturers, their distributors & salespeople.

#### **WHY ATTEND?**

- Learn about the complexity of solar radiation within the greenhouse environment, and the primary effects of the greenhouse covering on the light and heat environment of the crop.
- Separate the information and misinformation.
- Know what critical factors to determine before judging the results of a transmission test.
- Gain understanding of procedures and instrumentation for determining and interpreting radiation transmission of greenhouse glazing.
- Become better prepared for completing an in-house test of your own films, or for supporting a professional test program of your product.
- Take advantage of an optional pre-workshop product film test.

#### **REGISTRATION:**

\$550 per participant, 20% reduction for 3 or more from same company. \$300 for CCEA partners. Workshop will be limited to 30 attendees.

Register at the following website or call the numbers listed below.

<http://aesop.rutgers.edu/~ccea>

Tel 732 932 9753

fax 732 932 7931

e mail [giacomel@bioresource.rutgers.edu](mailto:giacomel@bioresource.rutgers.edu)

For room reservations call the Hilton Hotel  
@ 732 828 2000

## **Continuing Education Opportunities**

**New England Greenhouse Conference  
October 19 thru 21, 1998**

*This year's new location is at the  
**Centrum Center in  
Worcester, Mass.***

*Contact Larry Carville at  
PO Box 117*

*Vernon, CT 06066-0117*

**website <http://www.uvm.edu/~pass/greenhouse/negc.html>**

## **Greenhouse Design and Environmental Control Short Course**

January 11-12, 1999

This short course features one and one half days of technology transfer and a one-half day tour to several state-of-the-art greenhouse operations. Topics for study and discussion include, greenhouse heating and cooling, space utilization, glazing choices, crop production systems, irrigation systems and design of floor heating systems.

Speakers include; **Ralph Freeman**, well-known Floriculture Specialist with Cornell University at Riverhead, Long Island, **John Hoozeboom**, CEO of Agronomico International Inc., Hendersonville, North Carolina, **Dr Gene Giacomelli**, Horticultural Engineer in the Bioresource Engineering Department at Rutgers University, and **Dr. George Wulster**, Floriculture Specialist at Rutgers University. Your editor is Faculty Coordinator and also speaker on the program.

Additional information is available from your editor or from **Kirsten Olsen** at The Office of Continuing Professional Education 732 932 8451.

## **New Jersey Annual Vegetable Meeting January 19 -21, 1999 Atlantic City New Jersey**

This extraordinary annual meeting is sponsored by the Vegetable Growers' Association of New Jersey, Inc. and Rutgers Cooperative Extension, Rutgers the State University of New Jersey and The New Jersey Department of Agriculture.

Each year this meeting for vegetable growers features one of the best trade shows and programs on the entire east coast. This year will feature a workshop on Post-Harvest handling of fruits and vegetables in addition to the regularly scheduled sessions. Plan now to attend these excellent meetings.

Additional information concerning the exhibition is available from:

Phil Traino, Executive Secretary  
at 609 985 4382.

## **15th International Lettuce and Leafy Vegetable Crops Workshop September 22-26, 1998 Holiday Inn Hotel-Boardwalk 111 South Chelsea Avenue Atlantic City, NJ USA**

This very informational meeting will be hosted by Dr. Wesley Kline. Great opportunity to get the latest up-to-date information. Registration information is available from him at:

Dr Wesley Kline  
Leafy Vegetable Conference  
291 Morton Avenue  
Millville, NJ 08332  
Tel 609 451 2800

### ***Cornell Dedicates New Research Facility***

Your editor was recently privileged to attend the dedication and grand opening of the **Long Island Horticultural Research Laboratory**. The research facility complex provides facilities to conduct experiments and demonstrations on field-and greenhouse-grown plants important to Long Island Horticultural Crop Producers.

This **13,000 square foot** custom-designed greenhouse greatly expands the capabilities to conduct experiments under very controlled conditions. The new greenhouse replaces two greenhouses which were present on the property when it was purchased in 1922. Features include:

- ⇒ **9 compartments** each equipped with individual computerized climate and irrigation control.
- ⇒ automatic ventilation, shading and cooling systems.
- ⇒ each is equipped for multiple irrigation systems (ebb and flood, trickle and drip, boom and hand).
- ⇒ floor heat options in two of the units.

It was good to meet **Dr. Daryl Lund**, Dean of Agriculture and Life Sciences at Cornell, and discuss items of mutual interest. **Dr Lund** was the featured speaker at the dedication along with **Jack Van de Wetering** local grower and chair of the Friends of Long Island Horticulture. Other speakers included **Donald Davidson**, Commissioner of New York State Department of Agriculture and Markets and **Joseph Siczka**, Coordinator of the research facility. **Henry Talmadge** a grower member of the advisory committee was master of ceremonies.

The program concluded with a wonderful evening barbeque.

### **Seed Storage\***

Seed is an important and costly input and requires careful treatment if the best possible performance is to be attained. Performance should be judged not only on germination percentage but also by speed of germination, uniformity of germination and seedling development.

The two most important factors in seed storage are relative humidity and temperature. High temperatures and relative humidities lead to a rapid deterioration in seed quality. Relative humidity is governed by the seed container, usually a foil wrapped sachet. Seed rapidly absorbs moisture once the packet is opened, therefore open packets should not be left lying around the seed sowing area. Seed should be stored at between 4 to 10°C (40 to 50°F) and 20 to 40% relative humidity. A frost-free refrigerator usually provides the ideal environment for seed storage.

The list below is a relative guide to the storage life of typical bedding plant seeds. It can be used to weigh up the risks of storing seed for extended periods of time. Ideally seed should be stored for as short a time as possible, but occasionally this is not possible. If seed is stored from season to season it should be tested for germination and vigour before use.

#### **Short storage life**

Aster, Begonia, Impatiens, Pansy, Salvia and Viola.

#### **Medium storage life**

Ageratum, Alyssum, Antirrhinum, Celosia, Cineraria maritima, Coleus, Cyclamen, Dahlia, Dianthus, Geranium, Lobelia, Marigold, Petunia, Portulaca and Verbena

#### **Long storage life**

Stocks, Sweet pea and Zinnia

*\*Courtesy ADAS Bedding and Pot Plant Technical Notes103. United Kingdom Newsletter published for growers.*

## **CREATING A MASTER PLAN FOR GREENHOUSE OPERATIONS**

William J. Roberts, Director, CCEA

*"Don't sew a shirt to a button."* This is a statement my predecessor, W.C. Krueger, always said to someone contemplating growth and expansion in an operation. The older I grow the more I realize that this is very sage advice. People who are the most unhappy after a change are those who altered existing facilities, tried to make them work, and ended up spending as much money as if they had built new, without the benefit of a new facility.

Changes in the greenhouse industry during the past 10-15 years have made greenhouse facilities much more expensive. This makes it necessary to plan the overall design of the facilities with extreme care in order to avoid costly retrofits at a later stage. A comprehensive master plan is required which reflects how the owner/operator intends the completed facility to look. A key component of the plan is the integration of all the systems and buildings comprising the entire greenhouse system.

For financial reasons, it is usually not possible to include all the desired systems and installations in the initial design of the facility. However, the overall plan should provide that these systems and installations are included and that they can be added at a later date without trouble or high costs.

It is always a good idea to establish priorities and not to compromise in the plan. The priorities and systems selected and included in the first installation should always be options that provide the greatest returns. The 'luxury items' can be added at a later date.

There are many items to consider in formulating a facilities master plan, because it is only part of an organizational master plan. It is always easier to add a greenhouse than to develop an overall goal and a plan to achieve it. Both technical and business management skills are required in any organization. Excellence in only one area cannot guarantee business and operational success.

These are some opening statements found in the new publication soon to be released, *Creating a Master Plan for Greenhouse Operations*, E221

This publication discusses the essentials of formulating a master plan for greenhouse operations and covers information on engineering and economic planning.

The bulletin contains information developed by John Hoogeboom, a greenhouse design consultant, on a step-by-step procedure for developing a greenhouse facility.

Information is also contained on roadside marketing including parking layouts and interior layouts of shelves and cash registers within the roadside market.

Another feature is the Greenhouse check list which a grower might use to ensure that the planning process includes all aspects of the production facility and no surprises are encountered after the greenhouse is constructed or the operation expanded.

The selection of equipment and facilities to operate the greenhouse is a major decision as well. The publication speaks to this issue.

Watch for its soon release!!

**New Guide Focuses on  
Commercial Perennial Production**

At last a publication about growing perennial plants for commercial production! Dr. Leonard Perry of the University of Vermont has written, *Herbaceous Perennials Production*. The 220 page publication is a guide from propagation to Marketing.

NRAES 93 is a comprehensive information source that considers the diversity of situations encountered by growers in businesses of all sizes. It brings together information under one cover which is extremely helpful to the grower, focusing primarily on production.

Key chapters in the book discuss production systems and schedules, propagation (including media, nutrients, environmental requirements, and methods), plug production, transplant and seedling care, nursery and field production and pest control, including deer and small animals. Although the focus is on nursery and greenhouse production of field or container perennials, the greenhouse plug and bedding plant methods of production are covered as well.

Dr Perry has been growing perennials in the United States for 28 years, both in the South and the North. Since 1981 he has been with the extension system at the University of Vermont. His research at Vermont has covered all aspects of perennial culture, particularly overwintering and hardiness.

NRAES 93 is available for \$27.00 for a single copy plus shipping and handling from:

NRAES Cooperative Extension  
152 Riley-Robb Hall,  
Ithaca, New York 14853-5701  
607 255 7654

**HORTICULTURAL ENGINEERING**

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**COOPERATIVE EXTENSION  
COOK COLLEGE  
RUTGERS, THE STATE UNIVERSITY  
NEW BRUNSWICK, NJ 08901**

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**Open-Roof Greenhouse**

A 48' by 60' open-roof greenhouse is being erected by CCEA on Hort Farm #3 on Ryders Lane. The footings are in place and the structure will be erected as soon as it arrives. We hope to learn more about the performance of this type of greenhouse throughout the growing seasons. Data acquisition systems will be installed to monitor the environmental control of the system. We