HORTICULTURAL ENGINEERING

Volume 13 # 1

KC'S Band and Friends

Recently in Dr. Din Sue Fon's home in Taipei, Taiwan a reunion was held of 6 former graduate students of Dr. KC Ting. Joining them were a recently admitted graduate student who will be joining the Bioresource Engineering Department January 1998 and Dr. Suming Chen graduate student with Professor Singley in the 70's. Dr Fon spent six months working with Dr. Ting in the department.

Seated from left to right are Dr. Suming Chen, Dr. Din Sue Fon, Dr Wei Fang, Shih-Wei Wu, Michael Wang, Derek

Chen, Steven Chiu, Wen-Hung Chang, Hsien-Hsing Hsiang (new student joining the department in January) and Dr. KC Ting. Joining them for the evening were Bill and Dottie Roberts and Dr. Fon's wife.

Dr Fang, one of Dr. Ting's students serves on the Faculty of the Agricultural Engineering Machinery Department of National Taiwan University and was very recently promoted to Full Professor.

KC'S Band Con't

It was a very inspiring evening for your editor as he saw first-hand the admira tion that each student had for his major professor. It was also inspiring to realize the privilege that he has had to work with Dr. Ting in the Bioresource Engineering Department for so many years.

ISAMA MEETING GREAT SUCCESS

The International Symposium on Agricultural Mechanization and Automation held recently in Taipei was a great success. The symposium, organized by the Chinese Institute of Agricultural Machinery and the Department of Agricultural Machinery Engineering, produced two volumes of proceedings totaling 475 pages.

Topics ranged from your Editor presenting the Burlington County Resource Recovery Research and Demonstration Greenhouse, Computerized Decision Support for Phytomation Systems by KC Ting to "Let's Listen to The Plants' by Dr. Murase from Osaka University in Japan. Other topics included, Watermelon Harvesting Robot, Chrysanthemum Cutting Sticking Robot, Robotic Transplanter for Bedding Plants and the Development of a Computer Based System for Indoor Aquaculture using Process Control Software.

Of the 150 who attended, approximately 60 participants were from overseas with the largest representation from Japan and Korea.

Editor Visits Oshima Japan

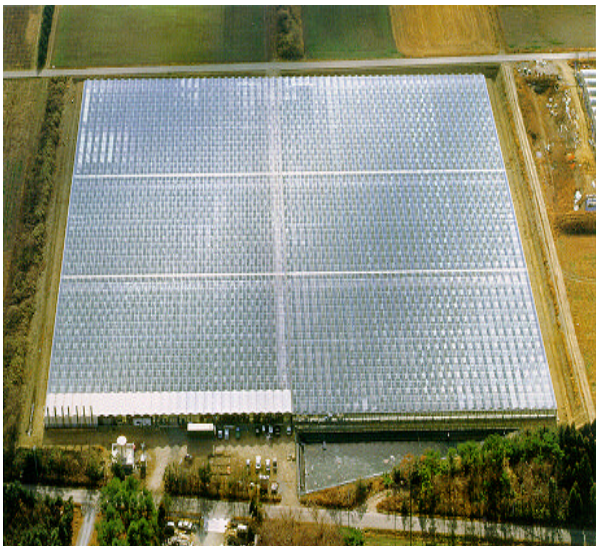
On my recent trip to the Far East I was privileged to visit the small island of Oshima off the coast of Kyushu near Nagasaki, Japan. While there I made a presentation of Controlled Environment Agriculture in the USA to a team from the Oshima Shipbuilding Co, one of the largest in Japan. On this small island where 6000 people live, the shipyard of Oshima employs 1000 people.

One of the current efforts of the company is to import Dutch glass greenhouses and sell them to Japanese growers for vegetable production.

Oshima con't

They also sell traditional single glazed Japanese PVC greenhouses for vegetable production.

The pictures show the type of facility they are importing and the traditional japanese structure they are marketing. At the site they demonstrated traditional rockwool systems and also a hydroponic bench type system.



View of a new 3 ha facility near Sendai Japan approximately 200 miles north of Tokyo.

The pictures in column one were taken as slides by your Editor on the trip. They were projected onto a flat wall and then a photographed by a digital camera. Once digitized they were introduced into the newsletter. The pictures in column 2 were scanned from literature of the Oshima Company. *Your Editor*

Continued from Volume 12 #6
(NRAES 112) Apple Harvesting .Storage)

Recommended Cooling Practices

Even though CA rooms may be equipped with high capacity evaporators, fruit may not cool as quickly as predicted or desired because the cold air does not come in contact with the apples. Bins need to be stacked in a manner which optimizes the airflow and maximizes the exposure of fruit to the cold air. Air does not willingly penetrate the stack of bins but instead takes a path of least resistance over the surface rather than moving through openings in the bin or through the mass of apples. As a result, it is possible to have inadequate cooling even though sufficient refrigeration tonnage is available.

Based on the cooling data from previous work, it is unwise to directly load warm fruit at a rate exceeding 10% of the CA room capacity (or 2 rows of bins across the back wall) in one day. When warm fruit is placed directly in the CA room, the bins should be tightly and uniformly stacked across the back wall of the room, downstream from the evaporators. Pallet runners of adjacent stacks must line up with each other and face in the same direction as the air flow. Additional fruit destined for CA storage should be precooled to 40°F or lower and loaded in the CA room the next day.

When a small quantity of warm fruit is spread out to precool in an empty cold room it will cool faster than the fruit loaded directly into the CA room. If the precooling room is overloaded, fruit may not be sufficiently cooled for loading into the CA room at the desired time on the next day. Table 1 gives an estimate of the refrigeration ton

Recommended Cooling Practices con't

nage required to achieve specific cooling times for 1,000 bushel lots arriving at the indicated harvest temperatures.

From Table 1, it is possible to estimate the cooling time and refrigeration tonnage needed to precool fruit immediately after harvest. The selected cooling times of 24, 18, and 12 hours represent HCTs of 8, 6, and 4 hours, respectively. Note that approximately 20% of the cooling capacity of the cold room is utilized for other cooling loads and that 80% is available to precool the fruit. For example, if a room with 15 tons of refrigeration were used, approximately 80% of 12 tons of refrigeration would be available for precooling. This would be sufficient for cooling 1,000 bushels of 70°F apples in 12 hours. Alternatively, this room should be able to cool (12/10.2) or 1,180 bushels from 80°F to 40°F in 18 hours.

Each precooled "batch" should remain undisturbed in a cold room until the desired temperature is achieved. If a batch is not fully cooled by the time loading on the next day commences, fruit should be left in place until it is cool and another room used

Table 1

to precool the current day's harvest. Fruit at the back of the precooling room should be

Fruit Temp °F	24 hours	18 hours	12 hours
80°	7.6	10.2	15.2
70°	5.7	7.6	11.4
60°	3.8	5.1	7.6
50°	1.9	2.5	3.8

checked to insure it is not in danger of freezing if it is left in place for a second day. Placing hot fruit in the precooler with a previous day's partially cooled fruit is not recommended. Loading partially precooled fruit in the CA room is likewise not recommended because when more hot fruit from

Recommended Cooling Practices con't

recommended. Loading partially precooled fruit in the CA room is likewise not recommended because when more hot fruit from the orchard is loaded in front of it, a hot spot may be created in the CA room.

References

Bartsch, J. A. and G. D. Blanpied. 1990. Refrigeration and Controlled Atmosphere Storage for Horticultural Crops. NRAES Bulletin #22. Northeast Regional Agricultural Engineering Service, Cooperative Extension, Cornell University, Ithaca, NY.

Bartsch, J. A., M. C. Jorgensen, and G. D. Blanpied. 1990. Precooling of Apples for CA Storage. Agricultural Engineering Staff Report No. 90-1. ABEN Dept, Cornell University, Ithaca, NY.

Bartsch, **J.** A. and G. D. Blanpied. 1984. Cooling Rates of Apples in Tight and Spaced Stacking Patterns. Agricultural Engineering Staff Report No. 84-2. ABEN Dept, Cornell University, Ithaca, NY.

Mitchell, F. G., R. Guillou, and R. A. Parsons. 1972. Commercial Cooling of Fruits and Vegetables. California Experiment Station Manual 43. University of California, Berkeley, CA.

USDA. 1962. Cooling apples in pallet boxes. Marketing Research Report No.532. Agricultural Marketing Service, Transportation and Facilities Division, Wash, DC.

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Post Frame Building Handbook

Post-frame buildings, formerly called pole buildings are versatile as well as economical structures. They are used for storage, farm shops and livestock shelters. The 1997 revision of NRAES 1 presents in a clear and easy style the latest design considerations and construction methods for post-frame buildings.

This 78 page publication has 60 illustrations and 31 tables and provides essential information for the preliminary design of modern post-frame structures. This 1997 revision of the 1984 publication also has completely new sections on topics including building codes, zoning regulations, heating and ventilation, design stresses and engineering safety factors.

Post-Frame Building Handbook, Materials, Design Considerations and Construction Procedures is an ideal guide and ready reference for those working in the lumber or construction industry and for growers and producers who want to learn the fundamentals of post-frame building construction. It is available at modest cost from your editor or from:

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You might want to visit NRAES website for more excellent information on many agricultural topics.

http://rcwpsun.cas.psu.edu.NRAES

NTV Trade Show and Exhibition
Amsterdam Convention Center,
The Netherlands
November 3-6, 1998

Upcoming Meetings

January 20-22, 1998
New Jersey Vegetable Growers Conference and Trade Show

Trump Taj Mahal Casino Resort
Atlantic City, NJ

Trade Show info—609 561 9522
Program and registration 609 985 4382

American Society of Plasticulture
27th National Agricultural Plastics Congress
February 18-21, 1998
Tucson, Arizona
Trade show, tours including stops in Mexico and the scientific program.
Info call 814 238 7045 e-mail peh4@psu.edu

NEW ENGLAND GREENHOUSE CONFERENCE
October 19 -21, 1998

This popular grower conference will be moving to a new location, the

New Worcester Convention Centre

This event attracts over 2000 participants and 130 exhibitors from the US and Canada. Make plans to attend and in the meantime visit their website @:
www.uvm.edu/~pass/greenhouse/negc.html

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