

University of Kentucky
Station Report for NCR-101 Meeting
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1. New facilities planned or installed

UK is in the process of replacing and expanding the research greenhouses at an off-site location south of main campus. The plan for the new facility has ten double poly greenhouses and one open-top greenhouse. We are hopeful that construction will begin some time this year.

Three high tunnel houses of different configurations will be installed as part of a three-year study to develop natural ventilation control strategies for temperature control in a tobacco greenhouse. The houses will be similar to the tobacco plug production houses used around the state. The objective is to develop natural ventilation strategies for small greenhouse operations.

2. New control systems and instruments

The new facilities will have automated controls and datalogging capabilities. In addition, we will be installing a Management and Control for Quality (MACQU) unit as a secondary control unit. The MACQU system was developed in Greece with European Union funding. The system is a versatile research tool that could be used in a commercial operation.

We have acquired a FLIR Thermal Imaging System. The S60 camera will be used to monitor and record plant canopy changes. In addition, there are many other applications in animal and poultry heat stress detection, building energy efficiency, among other projects.

A Li-Cor 6400 photosynthetic analysis system has also been purchased. The device will be used to monitor the physiological changes in plants under investigation.

3. Cooperative/Interdisciplinary projects

Hypoxia project to examine low oxygen (<1%) conditions as a means to fumigate incoming/out-going greenhouse plants. (Bob Anderson, Hort. Dept. and Rich Gates and Joey Norikane, BAE Dept.)

High Tunnel/Tobacco Greenhouse Temperature Control Strategies. (Bob Anderson, Hort. Dept. and Rich Gates and Joey Norikane, BAE Dept.)

4. Recent publications

- Zolnier, S., **R.S. Gates**, R.L. Geneve and J.W. Buxton. Evapotranspiration-based misting control for poinsettia propagation Transactions of the ASAE 46(1):135-145.
- Yanagi, T., Jr., H. Xin, **R. S. Gates**. 2002. Optimization of partial surface wetting to cool caged laying hens. Transactions of the ASAE 45(4):1091-1100.
- Zolnier, S., **R.S. Gates**, R.L. Geneve, J.W. Buxton. 2001. Surface diffusive resistances of rooted poinsettia cuttings under controlled-environment conditions. Transactions of the ASAE 44(6): 1779-1787.
- Zolnier, S., **R. S. Gates**, R. G. Anderson, S. E. Nokes and G. A. Duncan. 2001. Non-water-stressed baseline as a tool for dynamic control of a misting system for propagation of poinsettias. Transactions of the ASAE 44(1): In press
- Gates, R.S.**, K. Chao and N. Sigrimis. 2001. Identifying design parameters for fuzzy control of staged ventilations control systems. Computers and Electronics in Agriculture 31(1):64-71.
- Held, D., D.A. Potter, **R.S. Gates** and R.G. Anderson.. 2000. Modified atmosphere treatments as a potential disinfestation technique for arthropod pests in greenhouses. J. Econom. Entomol. 94(2):430-438.
- Norikane, J.H.**, G.K. Tynes, and H.G. Levine. 2003. Determining the Extractable Water Limit for Wheat in a Substrate-Based Media Designed for Space Flight Applications. Applied Engineering in Agriculture. 19(5): 565-569.
- Levine, H.G., G.K. Tynes, and **Norikane, J.H.** 2003. Fluid Behavior Under Microgravity Conditions Within Plant Nutrient Delivery Systems: Parabolic Flight Investigations. Paper No. 2003-01-2476. 33nd International Conference on Environmental Systems (ICES), Vancouver, B.C. Canada. July 7-10, 2003
- Levine, H.G., D.T. Rouzan, and **J.H. Norikane**. 2003. Evaluation of a Pulse Fertilization Strategy for the Cultivation of Plants in Space. Paper No. 2003-01-2615. 33nd International Conference on Environmental Systems (ICES), Vancouver, B.C. Canada. July 7-10, 2003
- Levine, H.G., **J.H. Norikane**, D.T. Rouzan, M.D. Best, T. Murdoch, and K. Burtness. 2003. Development of Technology and Experimental Designs for Plant Growth Studies in Space. Proceedings of the 40th Space Congress. May 2003. Cape Canaveral, Florida
- Norikane, J.**, E. Goto, K. Kurata, and T. Takakura. 2003. A New Relative Referencing Method for Crop Monitoring Using Chlorophyll Fluorescence. Advances in Space Research 31(1): 245-248.

5. Internet sites

<http://www.macqu.com/>