WISCONSIN NCR-101 REPORT
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T. W. Tibbitts, J. Palta, and P. Vanderveer

Biotron:

The Biotron is currently involved in several upgrades.

- The computer control system is being replaced utilizing new computers and LABVIEW^{tm} software. This will be accomplished in two phases. Phase 1 is currently under way and involves replacing the computers and installing LABVIEW^{tm} software. Phase 2 involves replacing the bus and control cards and will take place next year.
- The Wisconsin Energy Initiative (WEI) has targeted the Biotron for energy savings. The upgrade will save $38,149 per year in energy costs with an investment of $373,000 and a 10-year pay back. The energy conservation includes high efficiency motors, air handling unit control, chiller upgrade, dual duct VAV conversion and occupancy sensors. This upgrade is scheduled for later this year.
- Replacement of 770 leaking electrical ballasts that contain PCB's. This project was just completed and was initiated for safety concerns. Energy efficient electronic ballasts were considered but due to the poor operating life and high cost were not used. Standard electromagnetic ballasts (PCB free) were installed.
- Upgrading the control of the elevated CO_2 greenhouse rooms utilizing LABVIEW^{tm}. This is scheduled for the end of 2000 or beginning of 2001.
- Installing a light sensor system that would automatically control the lights in greenhouse rooms to come on during cloudy periods and turn off during sunny periods. This is being done as an energy conservation measure to reduce the heat load during the summer and save electricity year around. Individual rooms will be able to be isolated from this system.

More than half of the interior research space (excluding attached greenhouses) at the Biotron is used for animal research. As such the Biotron is inspected by AAALAC every 3 years as part of the University of Wisconsin accreditation commitment. We have agreed to meet or exceed all AAALAC guidelines and this is not easy. Changes in guidelines are difficult to keep up with and often not budgeted for. These improvement projects tend to be small and have a 3-year cycle time.

Other Facilities:

A cold temperature (-15 C) 36 sq ft chamber is on order by Dr. Palta. There were problems with an initial bid for the low bidder failed to provide dual-sided cooling systems that would provide needed defrosting at intervals.

The operating system for the Qcom controls in our instruction greenhouses is being upgraded from DOS to Windows to improve the efficiency of networking through the internet.

An upgrade of a 14,000 sq. ft. greenhouse range is on hold because the University wants to build a 90 ft high heating plant just to the south of the greenhouses. This will cause significant shading during the fall and winter months.

Control Problems:

It has been noted, that in two examples where fluorescent lamps were not adequately cooled, that they increased in temperature and the lamp output decreased in the red wavelengths (with decrease in PPF output). The light appeared blue in the chambers.

Publications:

Nitithamyong, A., J.H. von Elbe, R.M. Wheeler and T.W. Tibbitts. 1999. Glycoalkaloids in potato tubers grown under controlled environments. Amer. Potato J. 76: 337-343.

Tibbitts, T.W., K.E. Cushman, X. Fu, M.A. Anderson and R.J. Bula. 1998. Factors controlling activity of zirconia-titania for photocatalytic oxidation of ethylene. Adv. Space Res 22(10): 1443-1451.

Tibbitts, T. W. and B. Peterson. 1999. Toxicity of ethylene glycol vapors to cucumbers. HortScience 43(2): 221-222.