Web-based Monitoring and Data Acquisition – Applications in Arid Lands

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ABSTRACT

Controlled Environment Agriculture (CEA) is the production of plants and their products within structures such as a greenhouse that are engineered for controlling the plant environment, and capable of providing pesticide-free crops. It is highly productive, conservative of water and land, and protective of the environment. The technology of CEA crop production systems is changing rapidly, with systems today producing yields of vegetable crops never before realized. While the techniques of CEA culture in the arid lands are similar to those used in tropical and temperate regions of the world, the greenhouse environmental control strategies differ greatly.

The establishment of a Website for Controlled Environment Agriculture (CEA) will be presented to bring data from the newly-established off-campus hydroponic greenhouse to the university classrooms and worldwide research laboratories. The new website will present plant growth within the crop production system and emphasize learning by virtual observation. Real-time video broadcasting using web cams and historical time-series photo/video clips will effectively demonstrate plant growth and physiological responses from within the newly-established hydroponic greenhouse. Automated nutrient feeding, climate control systems, and real-time microclimate data will also be monitored through the web-based newly developed web-based data acquisition system. The website would facilitate interdisciplinary teaching, research, and demonstration of the hydroponic crop production system. Eventually, the technology should lead to a decision making package along with automated control units for hydroponic greenhouses in arid and semi-arid lands.