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Title:

Air and Water Temperature Relationship and Growth of Hyacinth and Primrose

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Abstract:

Temperature is a primary determining factor for plant growth and development so providing an appropriate temperature input is critically important for developing growth models. The Delta Region Areawide Aquatic Weed Project (DRAAWP), a USDA sponsored area-wide project including NASA Ames Research Center and State of California Department of Boating and Waterways, uses modeling to assess invasive aquatic plant impacts on ecosystem services in the Delta. Availability of continuous records for monitored temperature is limited and particularly in the case of water temperature the distribution of monitoring is inadequate. This work quantitatively defines the influence of air and water temperature in determining dominant growth rate processes for important floating aquatic invasive plants in the Delta. Since these plants function with portions submerged and above water we wanted to understand the relationship between root zone and shoot zone temperature and ability to use a single temperature inputs in DRAAWP models. Water Hyacinth and Primrose were grown in multiple controlled environment chamber studies with various combinations of root zone and shoot zone temperatures. Long-term growth studies provided integrated response of biomass accumulation and distribution within the canopy. Short-term gas exchange studies provide a time scale for responsiveness to temperature and a short-term study approach to evaluate temperature responses at various stages of canopy development.

Key Words: Air, Water, Temperature, Relationship, Growth, Hyacinth, Primrose