

Stability of Fluridone-Resistant Hydrilla (*Hydrilla verticillata*) Biotypes over Time

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Abstract

Hydrilla is one of the most serious aquatic weed problems in the United States, and fluridone is the only herbicide approved by the U.S. Environment Protection Agency that provides systemic control. Recently, hydrilla biotypes with varying levels of fluridone resistance have been documented in Florida. Hydrilla biotypes of varying fluridone resistance levels were maintained in 900-L tanks under natural atmospheric conditions from September 2004 to September 2005 in the absence of fluridone.

Hydrilla shoot tips were collected from each biotype during September 2004 (at planting), December 2004 (3 mo after planting [MAP]), March 2005 (6 MAP), June 2005 (9 MAP), and September 2005 (12 MAP) and exposed to 5, 10, 15, 20, 30, and $50 \mu\text{g L}^{-1}$ fluridone to assess changes in susceptibility to this herbicide over time. Nonlinear regression analysis was used to calculate EC50 values for phytoene and β -carotene (effective fluridone concentration to increase/decrease the phytoene/ β -carotene content in hydrilla plant tissue by 50% over the untreated control) at each time interval. EC50 values did not change in the susceptible hydrilla biotype over time. The EC50 values for phytoene and β -carotene for the susceptible biotype were 7.5 and $8.9 \mu\text{g L}^{-1}$, respectively, at planting and 7.6 and $9.4 \mu\text{g L}^{-1}$ respectively, at 12 MAP.

Resistant hydrilla biotypes (R1-R5) also showed no change in EC50 phytoene values over time. Although, EC50 β -carotene values in resistant biotypes R1, R3, R4, and R5 did not change over time, R2 recorded a reduction in EC50 β -carotene at 12 MAP. Also, a 0.5-point decrease in resistance factor was observed for all resistant biotypes. Future long-term studies are needed to evaluate stability of resistant hydrilla biotypes in the absence of fluridone selection pressure.