

In-water activity of glyphosate, 2,4-D, and diquat on waterhyacinth (*Eichhornia crassipes*)

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ABSTRACT

Waterhyacinth is an aggressive floating macrophyte that has been traditionally managed using foliar applications of 2,4-D and diquat. Recent research suggests that 20–25% of herbicide is lost to the water column. Here we evaluate the relative efficacy of subsurface applications of 2,4-D, diquat, and glyphosate to determine if spray loss from foliar applications provides additional efficacy through absorption from roots and submersed leaves. Plants were established in mesocosms and treated with diquat at rates of 100, 200, 400, 800, 1600, or 3200 $\mu\text{g L}^{-1}$. Both 2,4-D and glyphosate were applied at rates of 125, 250, 500, 1000, 2000, 4000, or 8000 $\mu\text{g L}^{-1}$. Total plant biomass was harvested after 28 days of static exposure. Results suggest that subsurface diquat applications are effective at waterhyacinth control, with total plant death observed at 3200 $\mu\text{g L}^{-1}$ and biomass reductions of 92% at 1600 $\mu\text{g L}^{-1}$. Neither 2,4-D or glyphosate was effective at reducing waterhyacinth biomass regardless of application rate. Results suggest that spray loss from glyphosate and 2,4-D applications represents wasted product and cost, whereas spray loss from diquat may provide additional efficacy on waterhyacinth.

Key words: subsurface applications, chemical control, herbicides, invasive aquatic plants, floating aquatic plants.

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