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Sequential applications of diquat to control flowering rush (*Butomus umbellatus* L.) in mesocosms.  
TURNAGE, JOHN D. BYRD, RYAN M. WERSAL, AND JOHN D. MADSEN

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Flowering rush (*Butomus umbellatus* L.) is an aggressive, invasive, aquatic plant spreading throughout water bodies in the northern United States and southern Canada, displacing many native aquatic/wetland plants. This can disrupt ecosystem processes and affect human uses of water bodies. Operational management in Detroit Lakes, MN, reduced flowering rush biomass and propagules by >80% using two sequential, submersed applications of diquat ( $0.37 \text{ mg L}^{-1}$ ) per growing season (4 wk apart). However, in dense colonies, long-term control has taken years to achieve, suggesting a more aggressive treatment regime may be necessary. A mesocosm study was initiated in 2015 and repeated in 2016 to further investigate diquat ( $0.37 \text{ mg L}^{-1}$ ; 12 h exposure time) efficacy using one to four biweekly (every other week) sequential herbicide applications to improve flowering rush control. All treatments reduced flowering rush aboveground and belowground biomass and propagule (rhizome buds) density compared with non-treated reference plants ( $P < 0.001$ ) at 8 and 52 wk after initial treatment (WAIT). There were no differences among diquat treatments, regardless of the number of applications. Diquat treatments reduced aboveground biomass 57 to 99% and 62 to 100% at 8 and 52 WAIT, respectively. Diquat treatments reduced belowground biomass 73 to 92% and 71 to 100% at 8 and 52 WAIT, respectively. Propagules were reduced 65 to 97% and 67 to 100% by treatments at 8 and 52 WAIT, respectively. This research suggests a more aggressive treatment protocol will not benefit resource managers; however, these results need to be field verified before existing treatment protocols are altered.