Sensitivity of nontarget aquatic and terrestrial plants to metsulfuron-methyl exposure by foliar spray or irrigation

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Recently, metsulfuron-methyl (MSM) was approved for a Special Local Need (SLN, Section 24[c]) label in Louisiana and Texas to control giant salvinia (*Salvinia molesta* D.S. Mitchell) in public waterbodies. However, there is limited data on nontarget species response to MSM. Therefore, mesocosm trials were conducted to determine the sensitivity of nontarget aquatic species to foliar-applied MSM and the phytotoxic effects of MSM treated irrigation water on nontarget aquatic and terrestrial species. Foliar applications of MSM at 10.5 to 84.1 g ha^{-1} reduced giant blue iris (*Iris giganticaerulea* Small) dry weight > 97% 7 wk after treatment (WAT). Broadleaf arrowhead (*Sagittaria latifolia* Willd.) and yellow water lily (*Nymphaea mexicana* Zucc.) showed little tolerance to MSM because biomass was reduced between 84 and 100% across all application rates. However, broadleaf cattail was the only species that demonstrated some level of tolerance to MSM with dose-response analysis revealing the effective dose to result in a 50% biomass reduction (ED_{50}) was 27.0 g ha^{-1}. Metsulfuron applied in irrigation water at concentrations up to 40 µg L^{-1} did not impact cherry tomato (*Solanum lycopersicum* L.) or vinca [*Catharanthus roseus* (L.) G. Don.] biomass. However, based on regression analysis, giant blue iris biomass was reduced 10 and 25% when irrigation water contained MSM at 13.8 and 37.6 µg L^{-1}, respectively. Additionally, soybean [Glycine max (L.) Merr.] biomass actually increased after irrigation with MSM at select concentrations. Based on these data, MSM in irrigation water at concentrations up to 40 µg L^{-1} should not cause biomass reductions in cherry tomato, vinca, and soybean, but should not be used to irrigate giant blue iris. Likewise, foliar applications of MSM should avoid contact with giant blue iris, broadleaf arrowhead, and yellow water lily.