Does the aquatic herbicide 2,4-D and a nonionic surfactant affect survival of salvinia weevil?
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Chemical and biological control methods are often integrated to manage unwanted plants. However, the application of 2,4-D near giant salvinia (Salvinia molesta Mitchell) may hinder biological control efforts by the salvinia weevil (Cyrtobagous salviniae Calder and Sands). Limited efforts have been made to examine the susceptibility of salvinia weevil to direct and indirect applications of 2,4-D. The objectives of these studies were to 1) determine the direct and indirect impact of 2,4-D amine (0.62 and 1.85 g ha\(^{-1}\)) and nonionic surfactant (0.25% v/v) on adult salvinia weevil survivorship, and 2) determine how different application rates of herbicide affect salvinia weevil survivorship. In a growth chamber experiment, the application of 2,4-D directly to salvinia weevil resulted in 9% mortality, whereas surfactant alone or in combination with the herbicide resulted in mean insect mortality of 21%. In a mesocosm experiment, the application of 2,4-D alone and in combination with surfactant to giant salvinia infested with the salvinia weevil resulted in 9 to 23% mortality, and the application of surfactant alone or in combination with herbicide resulted in 9 to 19% indirect mortality. Giant salvinia treated with 2,4-D resulted in a significant reduction in biomass relative to the nontreated plants. The mesocosm experiment provided evidence that 2,4-D alone and in combination with a surfactant has limited negative impacts on salvinia weevil mortality and future biological control programs should continue when using these methods together.