

**HERBICIDE FORMULATIONS FOR MANAGING FREE-FLOATING AQUATIC PLANTS.** J.D. Madsen and R.M. Wersal; Mississippi State University, Mississippi State, MS.

#### ABSTRACT

Floating plants, such as waterhyacinth, giant and common salvinia, are widespread problems in U.S. waterways. Cost-effective and environmentally-compatible control technologies are necessary for controlling these species, yet many invasive aquatic plants, such as the salvinia species, do not have appropriate herbicide recommendations for consistent control. Penoxsulam is efficacious as an aqueous exposure for control of waterhyacinth and salvinia at less than 10 ppb, but foliar application rates for use as a spot treatment are largely undefined. In addition, penoxsulam activity following a foliar application has been reported to take more than 60 d to control hyacinth. We set up trials of penoxsulam with and without diquat in 100-gallon outdoor tanks at the R. R. Foil Plant Research Facility, Mississippi State University, Starkville, MS. Each tank was inoculated with 200 g wet weight of either waterhyacinth (*Eichhornia crassipes* (Mart.) Solms) or common salvinia (*Salvinia minima* Baker), and allowed to grow for 4 weeks before treatment. All tanks were amended with nutrients regularly to maintain growth. Tanks of both species were treated with foliar application at rates of 0, 1.4, 2.8 and 5.6 oz./acre (5.6 oz/acre is the proposed maximum label rate) of penoxsulam alone (as Galleon<sup>tm</sup>) and in combination with 4 oz./acre diquat (as Reward<sup>tm</sup>). A methylated seed oil surfactant labelled for aquatic use (Sunwet<sup>tm</sup>) was used (0.5% v/v). Tanks were flushed and refilled three times to remove any residual herbicide in the water, 48 hours after treatment. Each treatment was replicated three times, for a total of 24 tanks per species or 48 tanks total. Each week, tanks were rated on a 0-100% scale for control, at 10% increments. Two 0.05 m<sup>2</sup> samples were taken from each before treatment for pretreatment biomass, and again at 6 and 10 weeks after treatment (WAT). Percent control ratings for penoxsulam-treated common salvinia, with or without diquat added, were 70% to 80% at 1 WAT, and significantly higher than plants treated with diquat alone (30%). Beginning by 4 WAT, however, those plants not exposed to sufficient penoxsulam began to regrow, resulting in negligible control by 7 WAT. While better than diquat alone, penoxsulam did not provide even three months of control for common salvinia. Control estimates from biomass data for common salvinia indicated that, while biomass for treated plants was still less than the untreated reference at 6 and 10 WAT, percent control was 50% or less. In contrast, penoxsulam was highly effective on waterhyacinth. Penoxsulam alone at all rates provided only 25% control at 1 WAT, but by 3 WAT percent control had increased to 80% and by 4 WAT percent control was 95% or greater. While penoxsulam with diquat treatments provided higher initial control, percent control after 4 WAT was reduced relative to penoxsulam alone. Biomass data for waterhyacinth also substantiate that all rates of penoxsulam provided at least 95% control at 6 and 10 WAT, while penoxsulam with diquat or diquat alone provided significantly less control. This trial indicates that 1.4 oz./acre of penoxsulam alone with a surfactant provided excellent control for waterhyacinth, but no treatments were found to adequately control common salvinia. Further work needs to be done on ensuring full contact with common salvinia plants, either through the use of aqueous treatments, adjusting the timing of treatment, or utilizing multiple treatments of penoxsulam or other herbicides.