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Biological Control of Common Salvinia in Louisiana

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The United States Geological Survey lists over 30 non-native aquatic plant species colonizing water bodies in Louisiana. Some have been here for decades and remain fairly rare (such as Asian duck lettuce) while others (such as common salvinia, Salvinia minima), have covered hundreds of thousands of acres in the last 20 years. Common salvinia, along with alligator weed, water hyacinth, hydrilla, torpedo grass and water lettuce are the six most troublesome non-native species in Louisiana. Common salvinia can be controlled with herbicides but relief is temporary and repeated applications are often uneconomical. Biological control could offer a cheaper and more permanent solution. Biological control of giant salvinia, Salvinia molesta, with the Brazilian weevil, Cyrtobagous salviniae, has been extremely successful in Africa, Australia and Asia, and is underway in the southern United States. A population of C. salviniae has apparently kept common salvinia under control in Florida for over 40 years. While there are some genetic differences between the Brazilian and Florida C. salviniae populations, they are presently considered to be the same species. The Florida strain of C. salviniae is not found in any other area in the United States.
In 2003 we initiated a biological control program in Louisiana against common salvinia with the Florida population of C. salviniae. A weevil colony was established on common salvinia in an LSU AgCenter greenhouse in May 2003 with several hundred weevils provided by Dr. Phil Tipping, USDA-ARS Invasive Plant Research Laboratory, Ft. Lauderdale, FL. Six hundred weevils were harvested from seven 150 gal tanks in August 2003 and releases of 100-200 weevils were made at four sites in south Louisiana. Release and control plots were established at each location and separated by a minimum of 500m. Plots were enclosed in a 1m² pvc frame. The following variables were measured at the time of release and during post-release visits: % salvinia coverage, salvinia growth stage,

wet weight of three 0.1m² samples of salvinia inside and outside the plot, pH, dissolved oxygen, surface water temperature, percent damage to 100 terminal buds and number of weevils found. No differences were found between control and release plots for any variable in fall 2003. In spring 2004, no weevils were found at the 2003 release sites. Weevils may have been present at the sites but populations were too low to detect. A total of 1319 weevils harvested from 13 tanks were released at three of the 2003 sites and two new sites from May 29 – July 29, 2004. Weevil releases were made in early summer in 2004 to give the weevil sufficient time to complete several generations and produce a sizeable population to enhance chances of winter survival. No differences were detected between control and release plots for any variables in the summer at the time weevils were released in 2004. In the fall there was a significant reduction in release plot biomass which was 63% of the biomass in the control plots. There was also significantly greater terminal bud damage in the release plots (86%) compared to only 30% damage in the control plots. Common salvinia terminal bud damage occurred all season long in control and release plots from a high population of the native caterpillar, Samea multiplicalis. There were no differences among the other variables measured. Weevils were recovered in four of the five release plots in fall 2004 and had dispersed from 1-10m. Weevils were not recovered at the fifth site but biomass and terminal bud damage levels strongly suggested weevil presence. The release sites will be sampled this winter to monitor weevil survival, and in the spring weevil survival and establishment will be determined.