APCRP: Application Aspects of Using Pathogen Biological Control Agents

Capability

***Myrothecium roridum* spores.**

A number of introduced aquatic plant species, including hydrilla, Eurasian watermilfoil, alligatorweed, waterhyacinth, giant salvinia, Phragmites, and Arundo — among others — have become problematic plants in or near water bodies throughout the U.S. Their uncontrolled growth results in the displacement of native species and interferes with flood control, hydroelectric power generation, navigation, and recreation. These exotic species thrive in their new environment because they have become established without a complex of natural enemies, including pathogens. Restrictions on chemical use combined with the appearance of herbicide resistance in plant populations have increased the need for development of alternative management techniques, including the use of plant pathogens.

The major objective is to develop, through applied research avenues, procedures to cost-effectively apply and use pathogenic organisms as augmentative biocontrol agents of introduced aquatic plants. Primary objectives include 1. isolating fungal pathogens from in-country populations of nuisance aquatic species; 2. screening potential pathogenic biocontrol agents for efficacy on the target host; 3. implementing research to develop cost-effective methods for formulating the pathogen into a bioherbicide; and 4. registering the bioherbicide for commercial use.

This research focuses on developing appropriate procedures for utilizing pathogenic agents effectively within existing aquatic plant management programs. This entails evaluating agent impact and effectiveness through laboratory, greenhouse, and in-field experimentation, developing cost-competitive formulations, implementing monitoring procedures to document field effectiveness compared with traditional herbicide treatments, and developing technology transfer protocols to rapidly transfer information on the use of bioherbicides to operational personnel. This research is accomplished cooperatively with various state and federal agencies, especially the USDA, ARS, universities, and interested community groups.

Applications

Currently, the main pathogen that is being evaluated is *Myrothecium roridum* as a potential broad spectrum agent for management of numerous aquatic nuisance species. Primary targets include monoecious and dioecious hydrilla and Eurasian watermilfoil. A second pathogen, *Mycoleptodiscus terrestris*, can be used alone or in an integrated pest management operation with either herbicides or insect agents. It is currently being used by an active community group to manage Eurasian watermilfoil in the upper peninsula of Michigan.

***Myrothecium roridum* damage to giant salvinia (*Salvinia molesta*)**

Status

Work began on monoecious hydrilla in FY13 and examination of new hosts for *Myrothecium roridum* will continue into FY17.

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