# Microsporidia as Classical Biological Control Agents: Research and Regulatory Issues

L.F. Solter and J.V. Maddox

*Illinois Natural History Survey, 607 E. Peabody Dr., Champaign, IL 61801 USA*

Nonindigenous organisms are a serious problem in most biological systems. The majority of these organisms were unintentionally introduced and many have become significant pests. The problems caused by nonindigenous pests have been extrapolated to the extent that the practice of introducing exotic biological control agents (insect parasites and predators), often to control introduced pests, has received increasing criticism over the past few years. Although there is little documented evidence that the introduction of exotic insect natural enemies for biological control programs has produced serious negative effects, the critics of classical biological control make some valid points which should be carefully considered by biological control specialists.

Few attempts have been made to use protists as biological control agents. In this paper we attempt to address some of the major difficulties associated with utilizing this group of pathogens. Our discussion will be limited to the entomopathogenic microsporidia because they are the most ubiquitous of the protistan pathogens in insect populations and the most promising of the protists for manipulation as biological control agents.

## CONCEPTS FOR THE USE AND REGULATION OF PARASITES AND PREDATORS

Most nonindigenous parasites and predators are intended for use as "classical" biological control agents. The usual aim is to reunite a nonindigenous pest with a natural enemy from the native home of the pest. The natural enemy is introduced into the nonindigenous pest population with the intention of permanently establishing the natural enemy in the new habitat of the introduced pest. Some of the most successful biological control programs in the United States have involved classical biological control introductions.

All biological control agents are by definition pesticides and are regulated under the Federal Insecticide, Fungicide and Rodenticide Act of 1947 (FIFRA) by the Environmental Protection Agency (EPA) (U.S. Environmental Protection Agency, 1986). The EPA has exempted parasitoids and predators from regulation under FIFRA for the reason that they are adequately regulated by the USDA Animal and Plant Health Inspection Service (APHIS) under the Plant Pest Act (U.S. Dept. of Agriculture, 1991), although the basis for this authority is somewhat arbitrary. APHIS considers beneficial insects "indirect plant pests„ because they directly affect plant pests. In addition to the regulations enforced by APHIS, biological control agents are also subject to regulation under the Endangered Species Act, the National