

Classical Biological Control of *Bemisia tabaci*
in the United States - A Review of Interagency
Research and Implementation

Progress in Biological Control

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Classical Biological
Control of *Bemisia tabaci*
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A Review of Interagency
Research and Implementation

 Springer

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Cover illustrations: A female *Eretmocerus* (an undescribed species native to Florida) feeds on fluids exuding from a *Bemisia tabaci* nymph that has been pierced by the wasp's ovipositor (top picture) and oviposits underneath a *B. tabaci* nymph (bottom picture).

Photograph credits: Mike Rose

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Dedication



This book is dedicated to Mike Rose (1945–2004), an author of Chapter 5, preeminent biological control specialist and inspirational mentor to many of the book’s authors. Mike Rose began his career at the University of California, Riverside, in the early 1960s working with Paul DeBach on biological control of whitefly, scale and mealybug pests of citrus. His career continued at Texas A&M University, and even in nominal retirement in Montana he remained very active as a biological control consultant. Mike’s expertise in biological control of whitefly and in the aphelinid genus *Eretmocerus* made him a natural leader and proponent of the biological control program for *Bemisia tabaci* in the USA. Mike’s influence can be seen in many aspects of the research reported in this book, especially in the taxonomy, quarantine evaluation, and postrelease evaluation of the natural enemies.

Progress in Biological Control

Series Preface

Biological control of pests, weeds, and plant and animal diseases utilising their natural antagonists is a well-established and rapidly evolving field of science. Despite its stunning successes world-wide and a steadily growing number of applications, biological control has remained grossly underexploited. Its untapped potential, however, represents the best hope to providing lasting, environmentally sound, and socially acceptable pest management. Such techniques are urgently needed for the control of an increasing number of problem pests affecting agriculture and forestry, and to suppress invasive organisms which threaten natural habitats and global biodiversity.

Based on the positive features of biological control, such as its target specificity and the lack of negative impacts on humans, it is the prime candidate in the search for reducing dependency on chemical pesticides. Replacement of chemical control by biological control – even partially as in many IPM programs – has important positive but so far neglected socio-economic, humanitarian, environmental and ethical implications. Change from chemical to biological control substantially contributes to the conservation of natural resources, and results in a considerable reduction of environmental pollution. It eliminates human exposure to toxic pesticides, improves sustainability of production systems, and enhances biodiversity. Public demand for finding solutions based on biological control is the main driving force in the increasing utilisation of natural enemies for controlling noxious organisms.

This book series is intended to accelerate these developments through exploring the progress made within the various aspects of biological control, and via documenting these advances to the benefit of fellow scientists, students, public officials, policy-makers, and the public at large. Each of the books in this series is expected to provide a comprehensive, authoritative synthesis of the topic, likely to stand the test of time.

Heikki M.T. Hokkanen, Series Editor



Editors Preface

This book reviews interagency research and development of classical (importation) biological control of *Bemisia tabaci* (biotype B) conducted in the USA from 1992-2002. The successful discovery, evaluation, release, and establishment of at least five exotic *B. tabaci* natural enemies in rapid response to the devastating infestations in the USA represents a landmark in interagency cooperation and coordination of multiple disciplines. The review covers all key aspects of the classical biocontrol program, beginning with foreign exploration and quarantine culture, through development of mass rearing methodology, laboratory and field evaluation for efficacy, to field releases, integration with other management approaches, and monitoring for establishment and potential non-target impacts. The importance of morphological and molecular taxonomy to the success of the program is also emphasized. The book's contributors include 28 USDA, state department of agriculture, and university scientists who participated in various aspects of the project.

Bemisia tabaci continues to be a pest of major concern in many parts of the world, especially since the recent spread of the Q biotype, so the publication of a review of the biological control program for the B biotype is especially timely. We anticipate that our review of the natural enemies that were evaluated and which have established in the USA will benefit researchers and IPM practitioners in other nations affected by *B. tabaci*. This book will also serve as a useful reference for scientists in the USA conducting research on the Q biotype of *B. tabaci*. It will complement other recent works on *Bemisia* that deal more broadly with a wide range of subject areas and consequently must treat importation biological control in much less detail. Although the book's theme is *B. tabaci*, the organization and conduct of the project serves as a useful model for programs directed at biological control of other whitefly species, as well as biocontrol programs for other pests. This book should also support and encourage classical biological control inputs into other integrated pest management systems.

We would like to acknowledge Deborah Winograd (USDA-APHIS-PPQ, Center for Plant Health Science and Technology) for her assistance in reviewing the book chapters for grammar, consistency, and reference citations.

Juli Gould
Kim Hoelmer
John Goolsby

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