Chapter 14

Synthesis: The Future Success of Biological Control

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1. RISK AND SUCCESS

Probably the most active current debate in biological control concerns the negative effects of biological control (compare, for example, the views expressed by Hopper (1998) and Howarth (1991)). Most practitioners would, however, acknowledge the potential for biological control to go wrong and unpredicted off-target impacts to result. Howarth (Chapter 13) presents an analysis of this aspect, illustrated with a range of examples. In Australia the typical ‘dinner-party response’ to the announcement that one works in biological control is ‘No more cane toads please!’. Certainly the introduction of this agent (*Bufo marinus* L.) to Australia in 1935 has led to many off-target effects resulting from its highly polyphagous nature and venomous defence glands (Twyford, 1991). Its range is extending by 27 km per annum and there is no prospect of its impact being lessened. Such episodes, which are echoed by other contributors to this volume, illustrate the need for biological control to be undertaken in a more rigorous and less hit-and-miss fashion than has sometimes been the case in the past. It will be critical to understand that populations of organisms (including biological control agents) continue to adapt and evolve so pre-release testing cannot
guarantee the long-term behaviour, host range and geographical range of the 
agent after its release (Chapter 1, Section 3.2.2).

There is clear evidence that biological control programmes do present 
risks. It is important to consider, however, that the impact of these needs to 
be weighed against the risks of dealing with the pest organism by other 
means (such as pesticides) or taking no action at all (Chapter 2). The latter 
would lead to economic loss and/or environmental impact in most cases. 
How to minimise risks in biological control has been the subject of other 
books (Hokkanen and Lynch, 1995; Follett and Duan, 1999) and it remains 
difficult definitively to separate the effects of biological control 
introductions from the effects of other human activity.

This book does include discussion of off-target impacts of biological 
control, but its chief mission is to raise the level of attention given to its 
other major attribute: success. If a wand were waved and all risk of off-
target damage from biological control magically removed, most programmes 
would still rate as failures. The quantitative and qualitative levels of success 
reported for the various branches of biological control by contributors to this 
volume leave ample scope for improvement. So the science and practice of 
biological control need to be better understood for the dual purpose of 
lessening the risk of unwanted effects whilst increasing the likelihood that 
the desired result – success – is achieved. Ultimately, avoidance of 
unwanted effects may be seen as just one aspect of success in biological 
control.

2. BARRIERS TO SUCCESS

2.1 Fragmentation of Biological Control

Biological control, as in all areas of science, has progressively become 
fragmented into sub-disciplines based on methodological approach (e.g., 
classical, augmentative and conservation biological control), taxon of target 
or agent and even the system being managed (e.g., agricultural, human 
health, natural area conservation). Whilst the degree of specialisation that 
this fragmentation has afforded to individuals and teams has allowed 
advances, there has been a cost. Classical biological control has traditionally 
been relatively well funded because of its established nature and track record 
of spectacular (if not consistent) successes. Augmentative biological control 
has received considerable attention during the ‘integrated era’ (Chapter 1), 
largely because of the product-based nature of the agents and scope for 
commerce, yet conservation biological control has largely been neglected.