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## Chapter 6

# Integrating Crop Bioterrorism Hazards into Pest Risk Assessment Tools

John D. Mumford, Adrian W. Leach, Johnson Holt, Frédéric Suffert, Ivan Sache, Benedicte Moignot, and R. Alexander Hamilton

**Abstract** Risks from intentional releases of organisms to agriculture, the food chain or the environment must be assessed to ensure proportionate planning, just as accidental releases from trade or natural spread must be predicted so that management can be organised. Pest risk assessment methods are well established for trade related introductions and it is efficient to build on these and adapt available risk assessment components from agricultural and environmental assessment tools. Some additional risk considerations, particularly related to the motivation, capacity and intended impact of a perpetrator should be included, and some key elements of trade related assessments, such as the volume of trade, may be irrelevant for intentional targeted releases. Risk levels from the various causes and impacts should be comparable to allow authorities to direct responses appropriately. Preventative actions, for both intentional and unintentional introductions, are particularly impor-

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tant. For intentional release this puts emphasis on motivation, capacity and sources. A scenario based approach to assessing intentional release risks is taken to develop a pest risk assessment tool that can cover the range of levels of potential activity. A risk assessment framework is illustrated and a range of example scenarios is described.

**Keywords** Risk assessment • Intentional release • Plant health • Agroterrorism • Bioterrorism • Biocrime • Biowarfare • Pest risk analysis • Risk model

## 6.1 Introduction

Traditionally, crop biosecurity efforts have focused on preventing and responding to the natural or unintentional introduction, establishment and spread of pests or pathogens. Government agencies and industries take steps to limit these accidental introductions through quality standards in trade, official rules on risk mitigation measures, public and private surveillance for new organisms, and control planning and capacity. This approach to biosecurity has driven standardised approaches to Pest Risk Analysis (PRA), which have been developed to enable risk managers to identify, assess, manage and communicate risks of this kind (IPPC 2004, 2007; EPPO 2011). Some European countries, such as the United Kingdom and France, have developed extensive national catalogues of conventional plant health risk (Baker et al. 2014; Defra 2015) and methodology for prioritizing plant pests (Moignot and Reynaud 2013), in order to comply with the requirements of the new EU plant health regulation (now agreed for implementation in 2019). However, in recent years there has been growing concern about the possible deliberate misuse of biological agents against agriculture and the food supply with a view to causing economic losses, generating fear and/or undermining social stability (European Commission 2007).

Referred to broadly as agroterrorism,<sup>1</sup> this possibility has, in turn, motivated calls at the national and international level to ensure that public and private responses to possible threats from harmful organisms include both unintended and intentional releases. This requires a reassessment and revision of standard approaches to PRA to explicitly account for the motives and capabilities of potential attackers who might choose to deliberately misuse biological agents in pursuit of particular political or ideological goals. As a consequence, security becomes yet another consideration, in addition to biosecurity, that should be incorporated within a Pest Risk

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<sup>1</sup> The term 'agroterrorism' is commonly used to refer to the 'deliberate misuse of biological agents against agriculture by non-state actors' (that is, a subset of 'bioterrorism'). However, in this chapter, we also include 'biocrime' and 'biowarfare' under this general definition. Our rationale is that each of these 'agro-risks' represents a mode of 'deliberate misuse', distinct from traditional views of risk in agriculture, which focus on natural or unintentional outbreaks. Each of these risks possess some specific characteristics, so 'bioterrorism', 'biocrime', and 'biowarfare' are defined in legal terms (see Chap. 7) and we consider a range of deliberate misuse scenarios in our analysis.