

## **Methods and approaches for the management of arthropod border incursions**

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Insect Invasions

First Online: 29 February 2016

Biological invasions are increasing and are strongly associated with negative agricultural, economic and ecological impacts. It is increasingly recognized that the primary focus in minimizing biological invasions should be to prevent initial entry of alien species. However, exclusion of terrestrial arthropods such as insects and mites is difficult, in part because of their relatively small size, cryptic habits, broad physiological tolerances and close association with various internationally traded goods. Here we discuss methods, approaches, management and intervention systems used by border biosecurity agencies to prevent entry of inadvertently transported arthropods. We examine the at-border systems that exist for the detection and identification of and response to alien arthropods, and discuss the constraints and challenges present in these systems. We critically review current border biosecurity systems and discuss their relative efficacy. We then discuss additional measures and key areas that could be addressed that may further improve these systems. These include: (1) the application of appropriate sampling strategies; (2) employment of suitable inspection methods adequate to detect small and hidden arthropods; and (3) thorough recording of methods, organisms detected and both negative and positive results of inspections. We emphasize that more research is needed on taxonomy, biology, genetics, distribution, host and disease associations, impacts and pathways of introductions for invasive arthropods. Of critical importance is the compilation of complete and accurate invasive species lists and high-risk species watch-lists. The adoption of these recommendations will contribute to improved biosecurity systems for the exclusion of alien, invasive and pest arthropods.