

APPLICATION OF DNA BARCODING IN FOREST BIOSECURITY SURVEILLANCE PROGRAMS

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ABSTRACT

The ability to distinguish non-indigenous species from the background diversity of native taxa is critical to the success of surveillance programs for detecting new introductions. Surveillance programs for alien taxa rely on the precise diagnosis of species, which can be complicated by sizable trap samples, damaged specimens, immature life stages, and incomplete taxonomy. The recent advent of DNA barcoding shows promise to circumvent some of the obstacles of pest monitoring and surveillance. We review the requirements for integrating DNA barcoding into monitoring and detection programs, and we note its relevance to the International Standards for

Phytosanitary Measures #27 (Diagnostic protocols for regulated pests). We highlight the utility of COI for detection with examples in tussock moths (*Lymantria* spp.) and the poplar shoot borer (*Gypsonoma aceriana*). Secondly, we present the results of a faunal survey of nocturnal Lepidoptera in one of North America's largest urban parks. We reveal how DNA barcoding facilitated the inventory by minimizing specialist time and increasing the sensitivity of detecting species at low density, including four newly introduced species. And lastly, we provide an update of the progress in developing barcode libraries for bark and wood boring Coleoptera.