

Phytosanitary measures to reduce borer infestations of wood packaging materials: Effects on infestation rates and future rates of establishment

Eckehard Brockerhoff^a, Andrew Liebhold^b, Robert Haack^b, Joseph Cavey^c, and Mark Kimberley^a

^a Scion / New Zealand Forest Research Institute, NEW ZEALAND

^b USDA Forest Service, Research & Development, USA

^c USDA APHIS PPQ, USA

Concerns about the impacts of invasive bark beetles and wood borers have prompted the development of phytosanitary regulations designed to reduce infestations of wood packaging materials (WPM) shipped internationally. The International Standards for Phytosanitary Measures, No. 15, Guidelines for Regulating Wood Packaging Material in International Trade (hereafter “ISPM 15”), requires the use of heat treatment or fumigation, to certain specifications, to achieve compliance of WPM used in international trade. ISPM 15 was first implemented in New Zealand in 2003 and in the United States between 2005 and 2006. While the treatments described above are known to be effective, reports of occasional interceptions of live borers in several countries indicate that measures to manage pathway risks are not (yet) completely effective. As part of a wider project to assess the benefits and costs of phytosanitary measures, we examined interception rates recorded in the United States and other countries, before and after the implementation of ISPM 15, to investigate the effectiveness of the policy. To estimate the effects of different levels of reduction of borer arrival rates, we modeled the relationship between establishments and relative arrival rate, as it applies across entire species pools of such species (as opposed to individual species). To do this we used comprehensive records of establishments and border interceptions of bark beetles and longhorned beetles from shipments originating from all over the world, as a proxy for relative propagule pressure. This enabled us to evaluate several efficacy scenarios of phytosanitary policy aimed at reducing invasions of borers transported unintentionally with international trade. The results indicate that the success of phytosanitary policy varies among species depending on their arrival rate, in a non-linear fashion. Effects on establishment will be greatest for less frequently arriving species while for the most frequent arrivals, reductions in arrival rate will result in less pronounced reductions in establishment, unless a phytosanitary policy is highly effective.

Corresponding Author:

Eckehard Brockerhoff

Scion (New Zealand Forest Research Institute)

PO Box 29237, Christchurch 8540, NEW ZEALAND

e-mail: eckehard.brockerhoff@scionresearch.com