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Native forests ravaged by bug imports

UC SANTA BARBARA (US) — Imported plants, which are now valued at more than $500 million annually, may be a boon for the U.S. economy, but are having a devastating effect on the environment.

A study conducted by researchers at University of California, Santa Barbara's National Center for Ecological Analysis and Synthesis finds that almost 70 percent of the most damaging non-native forest insects and diseases currently afflicting U.S. forests arrived via imported live plants.

Insects and disease organisms that come into the U.S. with imported plants are devastating native forests. For example, above, the hemlock wooly adelgid, an insect native to East Asia, feeds by sucking sap from hemlock trees. (Credit: BlueRidgeKitties/Flickr)

Published in the journal *Frontiers in Ecology and the Environment*, the study shows that in the last 43 years, the quantity of plant imports to the U.S. has risen by more than 500 percent, peaking at 3.15 billion plants in 2007. Nearly half of the imported live plants entering the U.S. are destined for either California or Florida.

Balsam woolly adelgids, small wingless insects that infest and kill firs, especially Balsam Fir and Fraser Fir, were introduced from Europe around 1900. They have destroyed roughly 95 percent of the Fraser firs in the Great Smoky Mountains National Park, and have had a significant impact on forests in the Pacific Northwest. (Credit: UCSB)

Once introduced, some of these imported insects and disease organisms become established, and a fraction of those become major economic pests.

For example, Sudden Oak Death, which is caused by the plant pathogen *Phytophthora ramorum*, was introduced **into the Bay Area and Big Sur regions of** California via nursery plants.

The disease has now spread through 14 counties in California, as well as southern Oregon, where it has caused large-scale die-off of tanoaks, live oaks, and black oaks.

The authors studied 82 high-impact invasive insects and diseases in detail. Of these, 95 percent of sap-feeding insects and 89 percent of foliage-feeding insects probably arrived on live plants. In contrast, roughly 85 percent of wood- and phloem-boring insects likely entered the country on wood packaging materials, logs, lumber, or other wood sources.

“The demand for live plants from outside the United States is not likely to diminish,” says Andrew Liebhold, a Forest Service researcher with the U.S. Department of Agriculture.

“As global trade expands, our knowledge of pest pathways must be improved to ensure trade is accomplished with minimal environmental degradation.”

The current research provides specific information that is critical to the development of policies to reduce the risk of pest species associated with the trade in live plants.

Current policies are based on outdated assumptions about the size and number of shipments, and do not address the very large number of plants now grown abroad for direct resale in the U.S., Liebhold says.

The authors describe several possible means to increase bio-security, including intensified efforts at plant inspection stations and precautionary measures that restrict plants from entering the U.S. until they have been assessed as posing very little risk.

They also recommend expanding the post-entry quarantine currently applied mainly to some crop plants to include ornamental plants and advocate better advance knowledge about pest insects and pathogens. In addition, they call for the development of integrated systems approaches that depend on expanded partnerships between researchers and industry.