

# Resistance Research and Breeding are Key to Forest Health

## *Statement of Problem and Request*



UGA2110082



Single tree and ecosystem level damage from white pine blister rust.

Sources: Top - Frantisek Soukup, Bugwood.org; Bottom - Dave Powell, Bugwood.org.



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Single tree and ecosystem level damage from emerald ash borer.

Sources: Top - Christopher Asaro, Bugwood.org; Bottom - Bill McNee, Bugwood.org.

Invasive species annually cost the United States more than \$120 billion in damages<sup>1</sup>. Invasive, non-native, pathogens and insects challenge the economic and ecological state of our forests and ecosystems. Widespread diseases and insect pests of trees negatively impact national and local economies by causing declines in forest resource-based markets, disruption of tourism, and may lead to more wildfires, in addition to direct effects on human health<sup>2</sup>.

In nature, trees, or “hosts”, attacked by invasive, non-native species of pathogens and insect pests are not able to effectively defend themselves; however, many scientific and technological advances have been made to harness the natural defenses of tree and develop what is called “host resistance”. This approach to management and conservation of affected trees and forest ecosystems represents the only practical solution to many tree-killing invasions. However, lack of funds and infrastructure has impeded crucial elements needed to carry out a successful program of research and implementation, including: germplasm collection, research on mass propagation techniques, tree resistance research, planting site availability, maintenance, and long-term monitoring.

To effectively develop a united framework of action, we advocate for the development of programs to ensure:

- » Sustainable funding and permanent research facilities to conduct tree resistance research and development
- » Long-term availability of expert staff and education programs to facilitate prioritized research
- » Active participation of stakeholders in monitoring, conservation, and maintenance of forest ecosystems.

We propose that these goals are best achieved through the establishment of Centers for Forest Pest Control and Prevention (CFPCP) within the U.S. Department of Agriculture, akin to the Centers for Disease Control and Prevention (CDC) under the U.S. Department of Health and Human Services. Such Centers should emphasize host resistance development and tree improvement for ecosystem restoration, in addition to other existing, desirable interventions, such as the use of sentinel plantings abroad to assess the risk of potential identified threats, prevention of introduction by way of pathway analysis, strengthened border inspections, etc. The Centers should be regional in scale and staffed by career forest pathologists, entomologists, geneticist, breeders, ecologists and economists, ready to cope with any new invasive pests that will undoubtedly continue to arrive and establish beachheads in our precious forests.

*Please see the following page of this document for a list of signatories, contributors, and endorsements.*

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<sup>1</sup> Pimentel, D., R. Zuniga and D. Morrison 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. *Ecological Economics* 52:273-288.

<sup>2</sup> Donovan, G.H., D.T. Butry, Y.L. Michael, J.P. Prestemon, A.M. Liebhold, D. Gatzliolis and M.Y. Mao 2013. The relationship between trees and human health - evidence from the spread of the emerald ash borer. *American Journal of Preventive Medicine* 44:139-145.