

Is There a Future for Oregon Ash? Forest Genetics to the Rescue?

Genetic & Emerald Ash Borer Resistance Projects

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Oregon ash (*Fraxinus latifolia*) is an important species on the West Coast of North America, particularly in riparian areas. But, the threat of the invasive emerald ash borer (EAB, [USDA APHIS | Emerald Ash Borer](#)), which has nearly wiped out green ash in parts of the country, suggests that the future of Oregon ash may be dim, and the species could go functionally extinct – something no one wants. Already, some municipalities such as Corvallis, Oregon have stopped using it in restoration projects and are now considering non-native tree species as replacements.

EAB has already made it as far west as Colorado, when will it arrive on the West Coast? Can we do anything to save Oregon ash? That is unknown, but the forest genetics/tree improvement and public gardens communities recognize the value of genetics and tree improvement (Showalter et al. 2018; Sniezko and Koch 2017). We have an early alert and have the chance to respond, but the time to start is now. What can we do? We can mobilize as a community, be proactive, and see what we can do for these communities around us that value *F. latifolia*.

Most species have at least some level of genetic resistance to diseases or pests. If this is the case for Oregon ash, then it may be possible to develop populations of ash for future restoration efforts. The USDA Forest Service's Dorena Genetic Resource Center is a world leader in the development of populations of trees with resistance to non-native pathogens such as white pine blister rust, Port-Orford-cedar root disease, and koa wilt (Sniezko and Koch 2017). A similar effort could potentially be launched with Oregon ash and EAB resistance.

Just as a journey of a thousand miles starts with a first step, the same is true for looking into the chances Oregon ash has of being maintained/restored when emerald ash borer reaches the Pacific Northwest. There are interested individuals and groups – if we work together, we can examine the genetic variation within Oregon ash and its potential for the future. The initial work would be to gather seed from a large array of ash parent trees, both for gene conservation, and a working collection to learn more about genetic variation in this species and information on possible genetic resistance to EAB.

Pictured to the right: (from top to bottom) Photos 1 and 2: Oregon ash trees in riparian areas, close up of Oregon ash leaves, Oregon ash seed clusters, Photo credit: Richard Sniezko

Note from the Author

Prevention is still our main goal – hopefully we can be vigilant and have early detection and eradication of EAB on the West Coast (I know the Oregon Invasive Species Council is being proactive in that regard; and California has just instituted a quarantine), but we also need the backup plan of knowledge of the degree of susceptibility and resistance within our native ash. The EAB threat could be a 'forever' threat (could happen soon; or could happen later, even with proactive measures), so knowing something about the genetics of *Fraxinus latifolia* will allow communities to know the long-term future of this species.



Objective

Begin proactive measures to address community concerns on the West Coast about the future fate of the important riparian species *Fraxinus latifolia* (Oregon Ash) by (1) initiating the first well documented resistance testing of this species to EAB, (2) establishing two genetic conservation plantings that will also serve to examine adaptive genetic variation and be a sentinel planting for the species, We believe that this will be the first investigation of genetic variation in this wide-ranging species, which occurs in CA, OR, WA & BC, and (3) preserve the genetic diversity of *F. latifolia* by depositing seed collections and storing them for long-term use and preservation prior to the very high mortality expected from EAB – these collections will also be a source for future genetic studies.

Progress to Date

The first gene conservation seed collections of Oregon ash occurred in fall 2019 – both Oregon Department of Forestry and the U.S. Forest Service were involved. Most of the collection were of parent trees in Oregon. In general seed viability (from xrays) appeared to be relatively low, but a large amount of seed was collected for many trees, ensuring sufficient seed for genetic trials. A few additional collections were made in WA in 2020. Collections were made by both agency staff and citizen scientists. Additional collections in OR are planned by ODF in fall 2021.

Using a subset of the seedlots collected, seed from individual parent trees were sown in spring 2020 to be used for (1) EAB resistance testing, and (2) common garden field trials in OR & WA.

A common garden field trial of 27 seedling families was planted at Dorena GRC in fall 2020, and additional seedlings of the same families were transported to WSU's Puyallup Research & Extension Center for planting in fall 2021 (Dr. Gary Chastagner is the contact there).

Seedlings of 17 ash families were sent to Dr. Jennifer Koch, USFS Northern Research Station, in early March 2021, for future EAB resistance testing (likely in 2022 when seedlings are larger).

Gene Conservation of all western ash species is now planned: worked with Tim Thibault and Brian Dorsey, at The Huntington ([Gardens | The Huntington](#)) to write proposals for funding to collect ash seed from all the western species in 2021 and 2023. The USFS FHP-WO funded the proposals and collections will be made in fall 2021 and 2022, including collections of *F. latifolia* in WA and CA. Tim & Brian will organize collections. Once this collection is completed there will be a more substantial range-wide collection of *F. latifolia* available to use for future genetic studies. Several groups in WA have been contacted to provide Tim with locations of ash stands for potential collection in fall 2021. Seed for *F. latifolia* will be stored at Dorena GRC, and also at the ARS facility in Ft. Collins, and at The Huntington.

Pictured to the right: Oregon ash (Fraxinus latifolia) common garden trial at Dorena Genetic Resource Center. Seedlings were planted in fall 2020, and have just recently (late April) began their 2021 growing season.

Want more information or are you interested in helping or staying abreast of developments?

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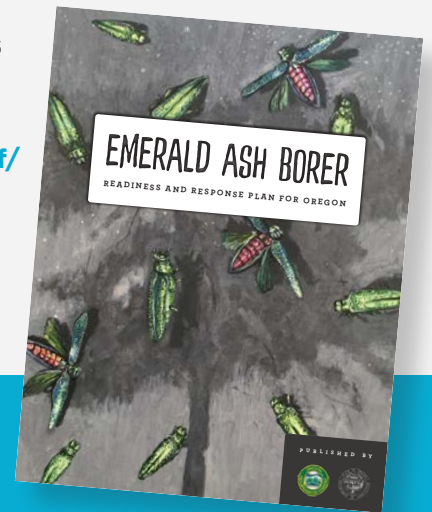
Acknowledgments

Thank you to the many professionals and citizen scientists who have assisted with seed collections, and advice on ash. The USFS Forest Health Protection (WO) and Tualatin Soil and Water Conservation District have provided funding for the common garden field trials and future EAB resistance trial in 2021/2022; and the FHP (WO) for the new seed collections scheduled for fall 2021. Thanks also to USFS NRS (Jennifer Koch) and WSU (Gary Chastagner) for hosting ash trials, ODF (Wyatt Williams) for many ash seed collections in OR, and The Huntington for their seed collections slated for WA and CA in 2021. The technicians and staff at Dorena GRC are thanked for all their assistance.

This is just a start on gathering information on genetic variation in ash. It is a project that will require inputs from many people, and an opportunity to enlist citizen scientist inputs and assistance.

See Oregon's 'Readiness and Response Plan' for other measures that are being contemplated.

<https://static1.squarespace.com/static/58740d57579fb3b4fa5ce66f/t/5b1ad1896d2a73a4cfcdad1/1528484258046/EAB+Plan+2018.pdf>



Background information on ash, genetic resistance in forest trees and related information:

Emerald Ash Borer –
Readiness and Response
Plan for Oregon

<https://static1.squarespace.com/static/58740d57579fb3b4fa5ce66f/t/5b1ad1896d2a73a4cfcdad1/1528484258046/EAB+Plan+2018.pdf>

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Oregon ash (Fraxinus latifolia) common garden trial at Dorena Genetic Resource Center. Seedlings were planted in fall 2020, and have just recently (late April) began their 2021 growing season. Photo credit: Emily Boes

