A Brief History of Native Plants©

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The term "native plant" seems to have entered the lexicon of horticultural speak in a big way over the past few decades. As a lifelong nurseryman and native plant grower, the question of what is a native plant comes up with great frequency around my office. It seems everyone knows what a native plant is, but we don't all agree on the same definition.

This seemingly straightforward word "native" creates enough controversy to cause some real confusion. A simple web search will quickly demonstrate the problem, and a good place to start is this Wikipedia definition which states: "Native plant is a term to describe plants 'endemic' (indigenous) or 'naturalized' to a given area in geologic time") (Wikipedia).

At first glance this doesn't look too bad to most people; however, as is often the case, one size really doesn't fit all. If we consider geologic time, the fossilized *Ginkgo biloba* forest in eastern Washington provides evidence of what once was a native plant in that region, of interest to a paleontologist, but not very useful for today's native plant propagator or restoration ecologist.

The words endemic and indigenous seem straightforward; however, when the word "naturalized" is added to this definition, things start to get fairly fuzzy. So here's another definition from the Pennsylvania Department of Conservation and Natural Resources that narrows down the description a bit more: "A native plant is one which occurred within the state before settlement by Europeans." This definition sets the starting line, at least in Pennsylvania, at the time of European contact. They also go on to address the issue of "naturalized" with this statement: "An introduced or non-native plant is one that has been brought into the state and become established. At the turn of the 21st century, about 1,300 species of non-native plants existed in Pennsylvania. That is 37% of Pennsylvania's total plant flora (which is about 3,400 species), and more introduced plants are identified every year." (The Pennsylvania Department of Conservation and Natural Resources)

The United States National Arboretum, like Pennsylvania, distinguishes "naturalized" from "native" in this statement: "A native plant is one that occurs naturally in a particular region, ecosystem, or habitat without direct or indirect human intervention. We consider the flora present at the time Europeans arrived in North America as the species native to the eastern United States" (The United States National Arboretum).

These definitions of a native plant are comfortable including everything present before European contact as native. This notion seems to have fairly wide acceptance in North America, though it's not universal. The History of Native Plant Communities in the South references John and William Bartram's 18th-century, historically significant expedition and book which notes the issue of Native American influence on the indigenous flora with this statement: "Native plant communities in the South have been much studied and written about since the Bartram's explored the region in the 18th century. Bartram noted that Native Americans as well as European settlers altered native plant communities by intentional burning, land

clearing for agriculture, clear cutting of timber, and introductions of exotic species from Europe and the Caribbean. The plant communities of the South were not pristine in Bartram's time, and they were not pristine when Europeans first arrived on these shores. The southern landscape had already seen 10,000 years of human history" (Owens, 2009).

"The last 400 years, however, have brought more radical changes than any caused by Native Americans. Today's landscape and vegetation are not only the result of a very long history of change; they are also the starting point of tomorrow's vegetation. To better understand the resource at hand, it is valuable to remind ourselves of how we got here so that, perhaps, we can do better in the future. For the purposes of this assessment, a native plant community is defined as a set of populations of plants naturally indigenous to an area that are interacting to the extent and degree that would have been observed prior to European settlement and share critical physiognomic and compositional traits. It is somewhat arbitrary to define what is natural in terms of a pre-European time frame, because it is impossible to separate the influences of native cultures from the historical landscape. However, even at the height of aboriginal culture in the Southeastern United States, Native Americans could not have had the impact on native vegetation to the degree that the Europeans had" (Owens, 2009).

The California Native Plant Society does not address the introduction of plant material from pre-European humans. They do, however, acknowledge the importance that indigenous plants played in sustaining the first Californians in this statement: "Our native plants grew here prior to European contact. California's native plants evolved here over a very long period, and are the plants which the first Californians knew and depended on for their livelihood. These plants have co-evolved with animals, fungi and microbes, to form a complex network of relationships. They are the foundation of our native ecosystems, or natural communities" (California Native Plant Society).

We North Americans might be willing to find one of these descriptions acceptable; however, our British friends would probably take issue with these definitions. The starting line for what is native takes on an even longer viewpoint in this description from the U.K. Woodland Assurance Standards (2008): "A species that has arrived and inhabited an area naturally, without deliberate assistance by man, or would occur had it not been removed through past management [by man]. Trees and shrubs in the U.K. are usually taken to mean those present after post-glacial recolonization and before historic times. Some species are only native in particular regions. Differences in characteristics and adaptation to conditions occur more locally" (United Kingdom Woodland Assurance Standards, 2008).

This gives you an idea of the some of the underlying ambiguity associated with the term "native plant," which might seem purely academic and of little consequence for most people; this lack of consensus, however, is problematic and of significant concern for the restoration community. Acknowledging the differences in characteristics within a single species as a result of local adaptation is important to the work this community does. These ecotypes or subdivisions reflect the biodiversity within an area that have adapted to a particular set of environmental conditions over a long period of time.

Douglas Tallamy (2007) describes the problem quite clearly in his book *Bring Nature Home* — "The broadest definition is also the most commonly employed: a

native is any plant that historically grew in North America. Some people recognize that it's a stretch to call a plant adapted to a California desert that's a native of New Jersey, but these same people happily consider all plants grown east of the Mississippi as native to any area in the east. Maps of U.S. Hardiness Zones are often used to justify the "nativeness" of one species or another. By this reasoning, a plant adapted to Zone 6 in Tennessee will serve as a fine native in the areas of Pennsylvania with a Zone 6 climate. The problem with these definitions of "alien"and "native" is that they do not consider the roles plants play within their respective ecosystems. I believe that what is and is not a native plant is best defined by nature herself. Because plants do not grow in isolation from other living things around them and are in fact essential to the lives of neighboring creatures, they interact with residents of their habitats in countless ways" (Tallamy, 2007).

Problems also arise even when the geography is broken down into much smaller areas like Washington State, or Whatcom County, Washington, or even a specific watershed. Because even though a plant like *Potentilla palustris* may have the same botanical name regardless of whether it comes from the wetland down the street or one in Maine or even Russia, the genetics may be completely different.

In my experience, this is where we nurserymen often come up short, and for good reason. The idea that a healthy cloned *Sambucus racemosa* which has been selected because of its tidy smaller stature, resistance to disease, and superior winter hardness, may be completely unacceptable to a restoration customer, is often perplexing. And why not — after all, we nursery growers have had centuries to hone our craft of propagating plant material cheaply, with uniform cookie cutter perfection that our ornamental plant customers have come to expect. While the quickest and cheapest way to produce a healthy vigorous plant may be the objective for ornamental production, it quite likely won't satisfy the needs of an increasingly sophisticated restoration community.

Put as simply as I can, propagating native species for environmental restoration is not just about the plants, it's about the entire habitat linkage. Sophisticated consumers of native plant species understand the importance of these symbiotic relationships and require a much greater attention to genetic origin; propagating to preserving genetic diversity is one of their objectives.

So when you look through a Fourth Corner Nurseries catalog you won't find a USDA Plant Hardiness Zone Map, instead, what you'll see is a reference to origin: we call it SS (for seed source) because 97% of what we grow is propagated from seed.

The sexual propagation of plants, using U.S. Forest Service Standards for seed collection, is how we capture the genetic diversity our customers are looking for. Forest Service collections have us picking seed from many different plants, while at the same time leaving enough behind for wildlife food and the "seed bank." Whereas making plant selections in the wild for eventual ornamental use would probably have us doing the opposite by searching for the nicest looking, smallest grower in a population to eventually clone and name. Propagating plants for U.S. Forest Service installations requires us to use site-specific seed collection with the finish crop harvested and shipped "row run." Rather than grading by size, which in some cases could end up separating the taller males from shorter females, their objective is to obtain the greatest range of diversity possible by taking plants of all sizes.

So when I visit an ornamental nursery grower and they tell me they're supplying native plants for a restoration project and they've given their customer the cultivar

Thuja excela in place of *Thuja plicata* or *Ribes sanguineum* 'King Edward VII' in place of *Ribes sanguineum* because "it grows better" and "no one will know the difference," I cringe a little. Unapproved species substitutions are never a good thing to do even in the ornamental world, but it's completely unacceptable in restoration where the damage these plants can potentially cause is often irreversible.

This attention to provenance is nothing new to the forest industry where seed zones are determined by elevation and genetic makeup. Likewise, the restoration community is also interested in preserving the genetic diversity within a given environ. Unlike an ornamental planting, native plants used for restoration are meant to mix with the surrounding flora and breed. Ecosystems are complex webs of interacting organisms, so when we introduce plants with a different genetic origin we impact the native population in unpredictable ways.

Generally speaking, it's probably fair to say that the scientific community has a long way to go to fully document these symbiotic relationships that have evolved over immense periods of time. So, "when a plant is transported to an area of the world that contains plants, animals, and diseases with which it has never before interacted, the coevolutionary constraints that kept it in check at home are gone, as are the ecological links that made that plant a contributing member of its ecosystem." Tallamy and others "argue that a plant can only function as a true native while it is interacting with the community that historically helped shape it" (Tallamy, 2007).

As naturalized alien plant species replace the native species in an area, the effect over time can be dramatic with the first changes being felt in the insect world. "If our native insect fauna cannot, or will not, use alien plants for food, which is usually the case, then insect populations will be smaller" (Tallamy, 2007).

This may sound wonderful to us growers or to the home gardener, but because so many animals depend on insect protein for food, "a land without insects is a land without most forms of higher life" (Tallamy, 2007). The Xerces Society has determined that one out of every four mouthfuls of food that we consume requires the presence of an insect pollinator; there's no way to overstate the importance of insects to a healthy eco system (Matthew et al., 2003).

More that 40 years have passed since the First Earth Day celebration and our universities have now produced a generation of smart, talented restoration ecologists.

A shift in thinking clearly is underway, with a greater understanding that the loss of genetic diversity is not a good thing. Therefore, when presented with the opportunity to restore habitat using native plants, it's important to remember that not all plants, even those of the same genus and species, are appropriate for a restoration planting.

The need for genetically diverse native plants is going to grow.

There is an international awareness for the need to reverse the destruction of native habitats. In addition, much of the world community has begun to look at our forests and rangeland as repositories for carbon capture in the fight to ease global climate change. Climate change is a non-localized problem, it doesn't matter where we live, greenhouse gases spread evenly throughout the atmosphere. So carbon capture is potentially an equal opportunity employer for plant propagators.

The large cap and trade regimes of the Europe Economic Community, over 20 U.S.A. states and other signatories of the Kyoto Protocol on global climate change have already begun foraging for carbon offset projects. Some of these projects will

inevitably require the propagation and installation of plants and most if not all will likely be selected with very intentional genetic origins in mind.

Vattenfall, a Swedish energy firm, has examined the potential for large-scale revegatation of wasteland to sequester carbon. They concluded that "there are approximately 1.86 billon hectares of degraded land in the world. This includes land that was once grassland, forested, or farmed. Of this, they believe that nearly half, 930 million hectares, has the potential to be reclaimed: an area larger than the entire United States (916 million in the U.S.A.)" (Kollmuss, 2007).

In addition to the demands of global climate change, there are also undeniable strains being imposed on the environment through increased population growth. The earth's human population is increasing by an extra Bellingham every 7 h and 39 min, an extra Canada every 163 days, an additional United States every 46 months. The need for careful management and restoration of the natural environment will only become more acute in the years ahead.

The potential for protecting, preserving, and restoring habitats is huge and native plants are going to be part of that. It's an amazing time to be a plant propagator, the needs are great and the demand will be satisfied by those who can supply the genetically diverse plants and seed that the market place will undoubtedly demand in the years ahead.

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QUESTIONS AND ANSWERS

Anonymous: Do you have a way of getting this information out on a larger scale?

Todd Jones: Our catalog has an article by Douglas Tallamy in it. We try to feature something like that in each of our catalogs.