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From Curios to Champions: Delayed Value in Plant Collections

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Summary

Modern plant breeding relies not only on new technologies and new germplasm, but new thoughts on existing, overlooked, or underappreciated plants. Often, these passé plants are the domain of arboreta, who collect, catalog, and curate these plant genetic resources for use by enterprising nursery professionals, public and private breeders, and academics. A given plant's perceived value fluctuates over its cultivated lifetime, whether the initial introduction was an immediate success or not. A vast majority of introductions and selections are relegated to the historical record, persisting as curios for collectors, but in many cases, their traits are awaiting a new trend, threat, or technology to rerelease their importance to American landscapes.

INTRODUCTION

Breakthrough breeding achievements, or "aha" moments, are often made possible by traits residing in less celebrated, forgotten, or even discarded plant selections, species, or even entire genera found in cultivation. Frequently, these plants are maintained through the long-term efforts in collecting, characterizing, documenting, preserving, and distributing by botanical collections. Support and advocacy for these institutions, like the U.S. National Arboretum (USNA), Washington, DC. and our colleagues in the American Public Garden Association (APGA) Plant Collections Network (PCN) program (www.publicgardens.org/programs/about-plant-collections-network) is critical for sustained growth and success in the nursery industry. But let us not forget, that much diversity available is in some state of cultivation or preservation outside of public gardens in the hands of nursery professionals, amateur collectors, and private gardens and arboreta.

The path from novel to established, from curio to champion is not a given. The norm for most plants' popularity settles into a middling ground: some descending from on high after a bit of excitement or hype, others ascending from more meager beginnings with slow recognition of utility and worth. And that popularity distribution shifts on many tides, influenced by fads and fashions, as well as changing social values that carry over to our gardens and landscapes. More consistently perhaps, is the ever-present danger of pests, diseases, and environmental stressors that knock plant champions from their perch. So herein, we step backward in time to provide a longer view and perspective at plant introductions and the delayed value or contributions common to many. Some stories will be known, others new, some insightful, some speculative, but on the whole worthy of telling.

DISCUSSION

Perhaps no plant went from unknown to commercial success as fast as dawn redwood (*Metasequoia glyptostroboides*). Dawn redwood's scientific discovery and introduction is well-known (Hu, 1998; Merrill, 1948; Nelson, 1998) with recent updates and corrections (Ma, 2003; Ma and Guofan, 2003). However, when viewed through the lens of commercial acceptance, its speedy path from an unknown to commercial champion is unheralded. Fossils were first discovered in 1938 and scientifically described in 1941. Also in 1941, unrelated researchers discover an unknown living conifer in Sichuan, however, herbarium specimens were not collected until 1943. In 1946, researchers match the herbarium and fossil specimens. In 1947, seeds and plants are collected and distributed to botanical institutes around the globe, including the Missouri Botanical Garden, St. Louis, MO and the Arnold Arboretum, Boston, MA in the U.S. The Arnold Arboretum distributes the bulk of the material, including to the USNA. In 1948 the species is officially described and announced to the world (Merrill, 1948). By 1958, USNA scientists select a clone from the original seedlings with a uniform, upright-pyramidal growth, which is officially released in 1963 as *M. glyptostroboides* 'National' (conifersociety.org/conifers/metasequoia-glyptostroboides-national/). Thus, within a span of 25 years, a plant went from unknown Mesozoic conifer, to living fossil, to commercial success and clonal selection. National dawn redwood found little traction in the nursery trade and

is itself a curio today, along with other cultivars like Waasland, a compact upright plant introduced through Bömer Nursery, Zundert, Netherlands. New selections likely to become commercial champions include 'Raven' (SHAW'S LEGACY ®), like National selected from the original seed distribution in 1948, and 'JFS-PN3Legacy' (Jade Prince ®) selected from commercially available seed.

The USNA was established by an act of Congress in 1927, the culmination of decades of lobbying by USDA officials, academia, industry, and garden clubs. David Fairchild, USDA scientist and plant explorer created and managed the Office of Foreign Seed and Plant Introduction and established experimental gardens across the United States. This effort included the National Arboretum, with a focus on ornamental plant introductions. Fairchild understood that cultivated varieties were the backbone of modern agriculture, and their discovery, genetic improvement, and distribution are fundamental aspects of a public garden devoted to economic work. The USNA has introduced over 650 new plant varieties, including floricultural crops, herbaceous annual and perennials, and all manner of woody shrubs, vines, and trees (www.usna.usda.gov/science/plant-introductions-and-releases/). Unofficially, the list grows to 850 with the inclusion of germplasm distributions that resulted in cultivar introductions by receiving nurseries and public gardens. We have certainly had our share relegated to curios and historical records (e.g., *Magnolia* 'Maryland' and *Ulmus parvifolia* 'Ohio;), however, many are still commercially relevant (e.g., *Ilex crenata* 'Sky Pencil' and *Deutzia gracilis* 'Nikko'), and still others contribute to ongoing developments within their respective genera (e.g., *Lagerstroemia* and *Viburnum*).

If the USNA's experience is reflective of plant introductions in general, then most selections are relegated to the historical record, persisting as curios for collectors, but whose traits are awaiting a new trend, threat, or technology to rerelease their importance to American landscapes. Take the Shantung maple (*Acer truncatum*). Introduced at the end of the 19th century and made available through USDA distributions of Frank N. Meyer's 1905 collections, the species remained obscure and underutilized for most of the 20th century. Horticulturists and breeders looking for heat-tolerant, and non-invasive substitutes for Norway maple (*Acer platanoides*) rediscovered Shantung maple. The first commercially viable selections, 'Fire Dragon' from Keith Johannson, MetroMaples, TX and 'WTF-AT1' (Main Street ®) from Worthington Farms, NC were introduced in 2006, and 2011, respectively. They were presaged by two *A. truncatum* × *A. platanoides* cultivars, Warrenred (Pacific Sunset™) and Keithsform (Norwegian Sunset™), of spontaneous hybrid origin, selected and introduced by Keith Warren of J. Frank Schmidt & Son Co., Boring, OR in 1990. Finally, after a century, Shantung maple went from curiosity in botanical collections to commercial champion.

Frank N. Meyer's success as a plant explorer for David Fairchild does not receive the attention it deserves by horticulturists. Meyer's tragic death in China cut short his career, and unlike other famed explorers (E.H. "Chinese" Wilson), Meyer covered all agronomic and horticultural crops, not just ornamental ones. However, Meyer's acumen and impact on American

landscapes is illustrated in just one shipment in one year. In 1908, Meyer hand delivered a large shipment of plants he collected from various sources and locations in or near Suzhou, Jiangsu, China to the USDA Plant Introduction Station, Chico, CA (Galloway, 1909). Within this shipment are introductions that saw immediate success, slow success, or a much-delayed success in contributing to American landscapes:

Viburnum macrocephalum **'Sterile'** PI22978. Meyer's collection is a reintroduction of Robert Fortune's original 1844 English import of the Chinese snowball viburnum. A classic Southern landscape plant, it has been in near continual commercial production since Meyer's introduction. The straight species (*V. macrocephalum* f. *keteleeri*) was not known in cultivation until collected and introduced by USNA botanist Ted Dudley in conjunction with the 1980 Sino-American Botanical Expedition from Zhejiang, China.

Ilex cornuta. PI 22979. Here, an unknown cultivated variety of Chinese holly. The species was another introduction by Robert Fortune in 1846. The USDA received *I. cornuta* seeds on several occasions from other sources or collectors (PI24638 in 1909; PI65860 in 1923; PI70979 and PI70980 in 1927) that by the 1950s yielded several introductions just beginning to receive commercial interest (Hume, 1953). Not only did the species contribute important cultivars (e.g., Burfordii, Carissa, Dwarf Burford, and Rotunda) but also genetics in holly breeding programs (Kosar, 1957). Today, older Chinese holly cultivars are curios, with some exceptions, but largely superseded by advanced hybrids carrying on their bloodlines.

Loropetalum chinense. PI22982. Chinese fringe-flower. Here, Meyer comments on the ornamental traits of *Loropetalum,* observes it is rarely cultivated and notes its transplanting difficulty. First introduced by Veitch collector Charles Maries to England in 1880, the species relishes heat and languished in cool English landscapes. Even in the U.S. the species rarely makes an appearance although old specimens are noted in South Carolina (Dirr, 1998) and Alabama (Martin Van Der Giessen, person. comm.). The 1980 rediscovery of the pink flowered, red-foliaged variety (*L. chinense* var. *rubrum*) in Hunan, China elevated its mass appeal (Wu et al., 2021). A Chinese industry developed around the variety focused on its introduction, propagation, and cultivation (Wu et al., 2021). From here it, quickly went global through the international nursery scene, with Chinese, Japanese, Canadian, and American nurseries, and horticulturists distributing clones, often the same ones under different cultivar names (Gawel et al., 1996). In 1986, there were no cultivars of any form of *Loropetalum chinense* in the U.S. As of 2022, there are 71 recognized cultivars and counting (Hatch, 2021).

***Syringa oblata*.** PI23030 and 23031. Purple and white early blooming lilacs. Technically, another reintroduction of Fortune who first sent plants of both color forms to England in 1859 (Fiala, 1988). Although hardy, the species and its varieties were not fully appreciated before the demand for heat-tolerant lilacs. The early bloom and thus lower chill requirements, makes *S. oblata* valuable in heat-tolerant breeding programs. The white flowered clone (PI23031) was used in at least 17 crosses in the early USNA lilac breeding program (Lura et al., 2013), before Fiala had named

the clone, *S. oblata* 'Frank Meyer' after its collector in 1988.

Syringa sp. PI23032 and 23033. These PIs were later determined to be a new species, *S. meyeri,* although its origins, taxonomy, and native range is debated (Fiala, 1988). Despite Meyer's observations, the "species" is quite hardy while being heat tolerant. Additional introductions from other collectors did little to popularize, perhaps due to a muddled taxonomy. The "species" remained a collector's item in lilac circles for much of the 20th century, taking a back seat to the common lilac (*S. vulgaris*) and its closer relatives. *Syringa meyeri* 'Paliban' was registered in 1980 and received awards from the Royal Horticultural Society in 1984 and 1993 (DeBard, 2022). Taxonomy aside, the "species" as the cultivar Paliban is an important component of modern breeding programs, contributing powdery mildew resistance, compact habit, and early to repeat blooming as in the popular BLOOMERANG ® cultivars Dark Purple ('SMSJBP7'), Dwarf Pink ('SMNJRPI') and new PURPINK™ ('SMNSPTP).

CONCLUSION

As we have seen, plant introduction is a cycle of rediscovery and recreation depended on curated botanical collections, horticulturists and nursery professionals seeking novel and underutilized plant genetic resources. Introductions like the forgotten 1907 Frank Meyer collection of *Buxus harlandii* (PI23013, Hangzhou, Zhejiang, China) is, over a century later, a critical source of tolerance to boxblight (*Calonectria pseudonaviculata* and *C. henricotiae*) in current breeding programs. Thankfully, it was preserved in the USNA's National Boxwood Collection, part of the APGA Plant Collections Network. Properly curated collections found at public gardens connect plant records with herbarium specimens and associated data. These, too, can be mined by plant breeders for discovering lost curios and relics, some of which are just under our noses. Although a pink form of smooth hydrangea was described by C.A. Rafinesque in 1838 (as *H. vulgaris* var. *carnea*), subsequent authors ignored his work and contributions, including Rehder (1949) who listed it as synonym of *H. arborescens,* even as he recognized the mopheads *H. arborescens* f. *grandiflora* and f. *sterilis* in the same publication. Uttal (1986) validated the proper combination, *H. arborescens* f. *carnea,* after finding pink forms in natural populations in Tennessee. The first pink cultivar was Eco Pink Puff, introduced by the late Don Jacobs, Eco Gardens, Decatur, GA. Essentially unknown, it was cultivated in at least one garden (Juniper Level Botanic Gardens, Raleigh, NC) by 1998 (Olsen, personal observation). A second cultivar, Wesser Falls, was introduced by the author in 2000 after its discovery in native populations near the Nantahala River in western NC (Ranney and Olsen, 2009). So, 162 years after its discovery and documentation, followed by taxonomic lumping relegating it to botanical obscurity did *H. arborescens* f. *carnea* leave the curio cabinet and contribute to American landscapes through plant breeding. By 2009, the world had its first pink, mophead smooth hydrangea, with a whole range of cultivars available in the INVINCIBELLE ® series from Spring Meadow Nursery, Grand Haven, Michigan in 2022. Imagine what other forgotten curios reside in the botanical collections of the United States and abroad awaiting rediscovery and reintroduction, as is or through plant breeding!

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