Paperbark Maple - A New Look at an Old Favorite, Part 2

By Anthony S. Aiello

As described in the Winter 2015 Maple Society Newsletter, (Vol 25/4), the familiar and desirable garden plant *Acer griseum,* (paperbark maple), is endangered in its native habitat in China. In that article, I described work completed along with Kris Bachtell of the Morton Arboretum, of locating and sampling venerable paperbark maples in cultivation throughout the United States and Great Britain.

Despite being a familiar garden plant, there have been a limited number of introductions of paperbark maple from the wild, with four into the United States, one into the United Kingdom, and one into Finland. As a result of this genetic bottleneck, there is probably limited genetic diversity among the plants in North America or Europe. With this in mind, I have been working on a project with colleagues from the Morton Arboretum (Lisle, Illinois, U.S.A), to determine whether the diversity of cultivated plants in the U.S. and UK adequately reflects the genetic diversity of plants in the wild, or if further efforts are needed to conserve this species. We have sampled plants of known wild origin in the United States and Great Britain, and travelled to China to sample trees from a number of natural populations. (Sampling means simply taking one or two leaves, and placing them in silica gel before DNA extraction and analysis takes place.)

This second instalment will describe work that Kris Bachtell, Michael Dosmann (Arnold Arboretum, Jamaica Plain, Massachusetts), Kang Wang (Beijing Botanic Garden, China), and I completed in September 2015. On this North American-China Plant Exploration Consortium, ("NACPEC") expedition, we sampled wild populations of *Acer griseum* across its native range in central China where it occurs across nine provinces.

With support received from The Maple Society, the Chanticleer Foundation, and NACPEC, we travelled within an approximately 500 mile radius of Xi'an, and visited paperbark maple populations stretching east to west from Shanxi, Henan, and Shaanxi to Gansu provinces, and south into Sichuan Province and Chongqing Municipality. These locations were gleaned from herbarium specimens located in several botanic gardens, and were also guided by a great deal of work recently conducted at the Chinese Academy of Forestry in Beijing, where a group of researchers have also been looking at the distribution and conservation status of *Acer griseum*.

Our trip began in Xi'an, the ancient capital of China and capital of Shaanxi Province, a fascinating city whose history was shaped as a terminus of the Silk Road. Our first field location was at Hong He Gu Nature Preserve, a popular tourist destination, where in 2010, Michael and I saw a lone tree wedged between a cliff face and a set of concrete steps leading to the Dragon Waterfall. Because we had

been there before, this collection was by far the easiest on the trip, like shooting a duck in a pond. There had been reports of more trees in this area, but because of dense fog, we had to be satisfied with the one collection.

The next stop on our trip was at the western extreme of the native range, in southern Gansu Province. Here we travelled to a rural area a few hours' drive from the city of Tianshui, but after an afternoon of searching in vain, we were unable to locate any trees. As we were to discover on the trip, our GPS locations led us to a general area, where we would be faced with a forested hill or mountainside, but still required a good deal of searching and asking locals for help in finding the trees. Fortunately, *Acer griseum* is a distinctive plant, known by the Chinese as xue pi feng or blood-bark maple, and this made it easier to ask for guidance. We left Gansu crestfallen, hoping that we would have better success on the upcoming legs of the adventure.

This was certainly the case when we visited far northeast Sichuan Province. After a morning of again spinning our wheels, a rigorous hike along the Swallow Hill Trail on Guangwu Mountain led us to several individual trees scattered across the mountainside. After first finding a much-abused and cut-back tree, we then encountered three large trees of 14, 20, and 31 cm (5.5, 8, & 12") diameter at breast height (DBH), one of which had a few seedlings beneath it. We quickly learned that the habits of forest-grown trees are much different than the full and rounded-crowned trees that are so familiar in cultivation. When grown with other trees in a natural setting, paperbark maples are stretched towards the light, often with the first branches many meters from the ground. The trees are also generally found on the edge of cliffs or rock faces, often making for precarious access to them.

From Sichuan we travelled to far northern Chongqing, near the city of Chengkou, where Pére Paul Guillaume Farges first collected *Acer griseum* in the early 1890s. In a small village not far from the border with Shaanxi Province, we were fortunate to meet Mr. Xia, a farmer who was very familiar with the local forest, as his family had the rights to cut wood from the area. Mr. Xia led us directly uphill to a large population of trees, growing along with *Illicium henryi*, *Quercus aliena*, and *Mahonia*. Despite being exhausted from a vigorous climb, we were excited to see the large number of trees in this area. This proved to be one of the two largest populations that we encountered, and here we sampled 22 trees. It was clear that the trees in this area had been cut successively over the past decades, and many of them had very large bases from which sprouted new stems. The largest of these had a basal diameter of 45 cm (18") with re-sprouted stems that each would make a respectable tree in any garden.

Our next stop was in southern Shaanxi Province, as the crow flies about 70 kilometers (44 miles) from our location in Chongqing, but even with modern highways and countless tunnels, an eight-hour drive through mountainous countryside. In this case, we were looking for a tree that was described by Rick Lewandowski, Teicheng Cui, and Edward Garvey on a 1995 NACPEC expedition. Driving three hours south from the city of Angkang, we arrived in the small village

View from Swallow Hill Trail on Guangwu Mountain, Sichuan Province, China. *(Photo: Anthony S. Aiello)*

of Long Shan Cun in Baixian Forest Station. It did not take long before we found this massive tree growing next to a small farmhouse. This was the tree reported in 1995, and near it were several seedlings, indicating that it was a viably reproducing plant. This was by the far the largest tree that we would see in China; it first branched at four meters, had an 84 cm DBH (33"), and was 30 meters tall. An added bonus in this village was finding an enormous *Corylus fargesii* (Farges filbert), and we were excited to make a seed collection from this tree.

From southern Shaanxi we continued northeast into western Henan Province. We did not stop while passing through Hubei province because the number of E.H. Wilson and NACPEC 1994 collections in cultivation provided adequate sampling from this province (see Part I of this article, Maple Society Newsletter, Winter 2015, Vol 25/4). Populations of *Acer griseum* in Henan were well-documented in the 19-teens by the Belgian plant collector Joseph Hers, who made a number of collections in western part of the province. Our visit to this area brought us to two very different sites. The first was Baotian Man Nature Preserve. Here, in a beautiful mixed deciduous forest of *Acer davidii*, *Carpinus cordata*, *Carpinus turczaninovii*, *Cornus kousa*, and *Quercus aliena* ssp. *acuteserrata*, we first encountered paperbark maples as we had come to expect them - perched on the

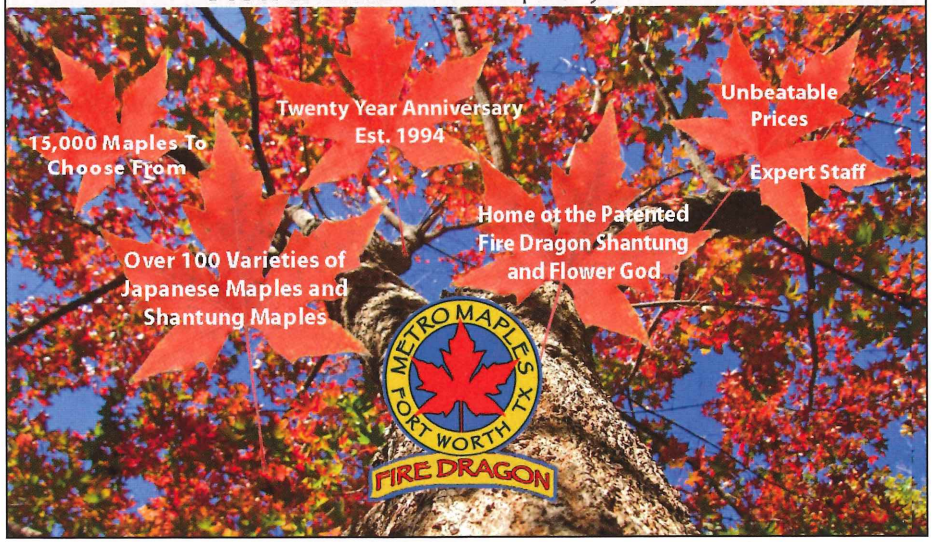
edge of rock outcroppings and stretching for the light - but then came across the healthiest population of our trip.

Growing for a few hundred meters along either side of a small stream valley was a group of well over 100 trees. These were of all sizes from seedlings and mid-sized trees a few centimeters in diameter, to mature specimens as large as 37 cm (15") DBH. This area was unlike anything that we had seen previously, with the mixture of sizes and ages indicating a healthy population actively recruiting young seedlings.

In contrast to the well-preserved forest of Baotian Man, our next stop in Henan was in a remote agricultural area. Here, mixed among row crops and managed orchards of *Cornus officinalis* (Japanese cornel dogwood), *Acer griseum* was growing among cultivated chestnuts (*Castanea*), *Forsythia suspensa*, *Quercus aliena* ssp. *acuteserrata*, and *Rhus chinensis*. This was an actively changing landscape, used intensively by its local inhabitants, and it was especially interesting to see paperbark maple in a far less pristine environment than on the previous day.

Continuing on our northeasterly track, we entered southern Shanxi Province, where Kris and I had collected in 2002. Here we visited the Manghe Nature Preserve, home to the rhesus macaque (*Macaca mulatta*) at its northern limit in China. This was a much drier forest than we had seen elsewhere on our trip, and because *Acer griseum* likewise reaches its northern limit in southern Shanxi these collections made a valuable addition.

Metro Maples - Growing "A Maple For Every Spot"
Specializing in Japanese and Shantung Maples
Visit Our Extensive Website - www.metromaples.com
Scott Hubble - metromaples@yahoo.com



From this point we completed our clockwise tour of central China and returned to Xi'an for few days of much-welcomed rest and sightseeing, including a day at the Xi'an Botanical Garden. Located in central Xi'an, the botanic garden is being squeezed by development pressures, so a new garden is being built on the outskirts of the city. We had visited the old botanical garden on previous trips to China and remembered a pair of paperbarks in their maple collection. We learned that they had been moved to the nursery at the new location. Thinking that these might be of a local provenance, perhaps from near the single tree that we had collected on our first day in Hong He Gu, these two trees became the final additions to our study.

In summary, the trip provided fascinating exposure to a wide range of conditions and habitats across the range of Acer griseum. In total, we came away with 66 samples, from nine locations in five provinces. Visiting the isolated populations, often a day's drive apart, provided a graphic understanding of what it means to be an endangered species. In some of the sites we encountered trees were scattered across a wide area, while in other sites there was a concentration of trees within a very restricted area.

Understandably, we must have encountered a bad seed year, because we saw seed on only three of the trees, but in most situations we encountered very little recruitment, again indicating a reason for the species' decline. Among all the trees that we saw, there was great uniformity in the leaf shape, bark, and growth habit,

BODIAM NURSERY

Huge variety of Japanese Maples
from 1L to 20L
including many dwarf cultivars.

Find us opposite Bodiam Castle
in East Sussex and at these 2015 shows:
Spring Garden Show, Ardingly;
Kent Garden Show;
Wealden Times;
Grow London;
Lambeth Country Show;
Wisley Flower Show.

Web: www.bodiamnursery.co.uk
Email:enquiries@bodiamnursery.co.uk
Jill Kaye: 01580 830811 or 07971 419302

Mountain view in far northern Chongqing Municipality, China.
(Photo: Anthony S. Aiello)

something that is certainly true among cultivated plants.

After we returned, colleagues from Hunan Forest Botanic Garden collected samples for us in Hunan Province, the southernmost populations of Acer griseum in China. All that remains is to find the elusive plants in Gansu Province, and we hope that Kang Wang will be able to return this summer to collect from those trees. We also plan to sample trees cultivated in Chinese botanic gardens to see if additional genetic diversity was captured in these collections.

As the final steps in this project, this coming summer we will sample additional cultivated plants on both coasts of the U.S., hoping to gain more insight into what diversity might exist. A major destination on the West Coast is Heritage seedlings (Salem, Oregon), most likely the largest supplier of *Acer griseum* in the U.S. Their seed orchard includes many fertile plants, including those that were grown from seed introduced from China in the late 1980s.

With that, the sampling that began in the summer of 2013 will end, and all of these leaf samples will be analyzed at the Morton Arboretum. We should see the results before the end of the year, and look forward to answering our question of how much diversity of wild populations is represented in cultivation. With this

information in hand, we hope to be able to help conserve this wonderful species of maple.

References:

Aiello, A.S. and K. Bachtell. 2015. *Paperbark Maple - A New Look at an Old Favorite*. Maple Society Newsletter. Winter 2015, Vol. 25 (4): 9-16.

Bean, W. J. 1970. *Trees and Shrubs Hardy in the British Isles*. 8th ed., Vol. I. J. Murray, London.

Gibbs, D. and Chen, Y. 2009. *The Red List of Maples* Botanic Gardens Conservation International, Richmond, England.

Sun, S., X. Yu, Y. Zheng, P. Chen, and C. Zhang. 2014. *Isolation and characterization of twenty-seven polymorphic microsatellite loci in endangered Chinese paperbark maple, Acer griseum (Dicotyledoneae: Aceraceae)*. Biochemical Systematics and Ecology 56: 99-103.

Xu, T., Y. Chen, P.C. deJong, H.J. Oterdoom, and C.S. Chang. 2008. Aceraceae. In: Wu, Z. Y. and P.H. Raven, eds. *Flora of China.* Vol. 11. Science Press, Beijing, Missouri Botanical Garden Press. St. Louis.

ACER ACRES

Acer Acres, Inc.
Beaverdam, Virginia
(804) 883-6765
www.aceracresinc.com

Specializing in Japanese Maples
Container Grown 3 Gallons
♦Larger Sizes Available♦

PROVIDING EXCEPTIONAL MAPLES TO WHOLESALE CUSTOMERS

SINCE 1988