Snake Bark Maples at UBC Botanical Garden

The maritime influence is significant at UBC Botanical Garden, as we are located on the southwestern edge of Point Grey, 100 m above Georgia Strait on the south coast of British Columbia. This creates ideal conditions for the remnant native conifer forest that defines much of the garden and for growing a wide range of A. species. The Botanical Garden has been collecting maples for about thirty years, and maples of documented wild origin (i.e., seed collected in the wild and the location recorded) for around twenty. To date, we have approximately one hundred maple taxa (species, subspecies and varieties), 55 of which are of documented wild origin.

The genus A. is separated into about fifteen sections, each representing major evolutionary divergences (DeLendick, 1981). Three sections are represented in the British Columbia flora - Glabra (A. glabrum), Lithocarpa (A. macrophyllum) and Palmata (A. circinatum) - and each has representation in the garden. By far, the greatest sectional diversification occurs in Asia, where all major maple groups are represented (Van Gelderen, 1994). The David C. Lam Asian Garden at UBC Botanical Garden is home to species from most of the sections, and there are also Asian and non-Asian species in other garden components.

Among the most beautiful and interesting groups is Section Macrantha, the snake bark maples. Conservatively, there are some dozen or more species; one is native to eastern North America A. pensylvanicum), while the remainder are Asian endemics. In residential gardens, this group is most often represented by the Chinese A. davidii (Father David’s maple) and its subspecies grosseri, and occasionally by the Japanese A. capillipes (red-budded snake bark), A. rufinerve (grey-budded snake bark), A. pensylvanicum (moosewood) and the Manchurian A. tegmentosum. Other species are rarely encountered outside of botanical gardens and arboreta.

The most recognizable feature of the snake barks is their attractive stems. Stem striping is due to waxes that are produced and accumulate in the longitudinal fissures of the expanding bark (Oterdoom & De Jong, 1994). While
the most common species exhibit strikingly striped stems, not all species do. To complicate matters, a few maples belonging to other groups have striped bark, particularly in youth; e.g., some forms of *A. stachyophyllum* (Section Glabra). Throughout the snake bark group, leaves are generally not very maple-like - i.e., in the sense of the “typical” maple leaf shape. They vary from unlobed to three- or five-lobed, mostly with a prominent central lobe. In some species, juvenile leaves are often significantly bigger than the adult leaves, and developmentally and seasonally heterophyllous leaves (i.e., leaves of different shape produced at different times) are not uncommon (Figure 1). Winter buds are the most reliable feature for positive identification of the group, as they are conspicuously stalked, with two pairs of valvate bud scales (Figure 2).

Bark striping is perhaps most developed in *A. davidii*, where stripes can be of varying thickness and whiteness, and are usually paired with streaks of dark green and/or wine red on a green or olive green background. This characteristic appears to be geographically related (in the UBC collection, red streaks are evident only on accessions from southern locales), but the correlation requires further investigation. On most species, the most obvious stripes occur on young shoots and gradually disappear as the outer bark becomes increasingly corky on older stems. An intermediate stage between visible stripes and their gradual obliteration by cork is sometimes seen (Figure 4), and this has been described as the “diamond bark” pattern (which both the grey- and red-budded snake barks commonly exhibit). Some stem shading is usually necessary to prolong the life of both bark stripes and the photosynthetic capacity of the stems, although this varies considerably between species and among individuals. For example, one much admired *A. davidii* in the David C. Lam Asian Garden is well over 25 years old and still has a striking green stem and clean white stripes to the ground. In contrast, no amount of shade prevents the disappearance of stripes on *A. tschonoskii subsp. koreanum* (Korean butterfly maple), whose beautiful white stripes on red are retained only on shoots younger than about four years old.

The Botanical Garden’s collection of snake barks would be considered reasonably complete by most standards, with 15 of the possible 21 taxa currently recognized in the literature represented. The two Taiwanese species, *A. caudatifolium* Hayata (Figure 3) and *A. rubescens* Hayata (Figure 5), are both represented by documented, wild collected accessions. Both are rare in gar-
dens. Their names are confused in the literature with the names A. morrisonense Hayata and A. kawakamii Koidzumi (both are synonyms of A. caudatifolium), and A. morrisonense Li (a synonym of A. rubeños). To make matters worse, an interesting plant in the collection came to us from a reputable Oregon nursery mislabelled A. morrisonense; in reality, A. tegmentosum - a species not native to Taiwan. The three are very different species and easily distinguished: A. caudatifolium has sea green, willowy branches that are faintly striped, and birch-like leaves with long, slender drip tips (hence the epithet caudatifolium - cauda'ta- means having a tail). A. rubeños is a more open tree, with white striped, green stems and red twigs and petioles, and coaster-sized, lustrous, five-lobed juvenile leaves - the tips of each lobe abruptly attenuated and spreading. A. tegmentosum (Figure 6) is notable for its startlingly chalky white stripes on blue-green waxy stems, and large three- to five-lobed leaves.

Despite the great distance between their respective habitats, A. pensylvaniam and A. tegmentosum are thought to be closely related. They share a number of similarities, including floral and vegetative morphologies, and are probably the hardiest species in the section. Unfortunately, UBC Botanical Garden does not currently have collections of A. pensylvaniam with which to make direct comparisons1. This will be remedied in the future, however, as there are plans to develop a Carolinian Forest Garden on the undeveloped hillside area north of Marine Drive, where significant collections of eastern North American species, such as maples, rhododendrons and magnolias, can be planted. The Carolinian Forest Garden will provide a showcase for these and other important plant groups whose species are shared between eastern North America and east Asia.

One hybrid snake bark maple, A. × conspicuum ‘Silver Vein’ (A. pensylvaniam ‘Erythrocladum’ × A. davidii ‘George Forrest’) can be seen in the Winter Garden. This cultivar is much celebrated for its excellent bark striping and vivid red new shoots, but despite its introduction more than forty years ago, it is not well known. Cultivar snake barks are more common in Europe and especially the United Kingdom, where a number are available in the trade; most of these are selections of A. davidii. In gardens there (and probably nurseries, as well), many supposed cultivars are unfortunately merely seedlings of said cultivars. Oddly, only a single A. davidii cultivar is regularly offered locally. This is the cultivar ‘Serpentine’, which, although somewhat more tender than most, is exceedingly attractive, with white-striped red and
green stems, red shoots and petioles, and small leaves. The Botanical Gar-
den has a total of nine A. davidii accessions, including one from seed col-
lected in Sichuan, China, that is similar to ‘Serpentine’. The remaining A.
davidii accessions are distinct, either in bark colour or leaf shape.

The Japanese species include A. capillipes (red-budded snake bark), A.
rufinerve (grey-budded snake bark), A. crataegifolium (hawthorn or uri maple),
A. tschonoskii (butterfly maple), A. micranthum (small-flowered maple) and A.
morifolium (mulberry maple). Many of these species are represented at UBC
by nursery-sourced plants. A. capillipes is fairly common around Vancou-
ver, thanks in part to the ease with which this species is grown from seed
and to local nurseries that for years sold it as A. davidii. Despite the confu-
sion, the two are easily distinguished on the basis of leaf shape alone. The
grey- is somewhat similar to the red-budded snake bark, though the backs of
A. rufinerve leaves have rusty hairs on the veins (Figure 7) and the young
shoots are covered with a blue, waxy bloom. For some years, Dutch nursery
stock of A. rufinerve arrived in Vancouver as A. grosseri (A. davidii subsp.
grosseri is a particularly beautiful and much sought after snake bark).

Hawthorn maples have faintly striped stems and sport very small leaves,
mostly of a shape reminiscent of Crataegus (hawthorn) or Malus fusca (Pacific
crabapple). Never more than a small tree or large shrub, this tidy species
deserves to be better known. Even less well known is A. morifolium, a poorly
described species that may well be an anomalous form of A. capillipes. The
botanical garden has a number of plants from seed collected recently on the
Japanese island of Yakushima. It is premature to describe such juvenile
plants, but at this age these maples look very much like young A. rubescens.

Of all the species, A. tschonoskii and A. micranthum look least like other
snake bark maples. They are shrubs or small trees on a scale with hawthorn
maple, but more spreading and vase-like in habit. Their stems are mostly
light grey-brown (except the youngest growth), their leaves broad, deeply
three- to five-lobed and coarsely serrated. A. micranthum is the smaller of
the pair, with slender drooping stems and tiny leaves. In the Asian Garden,
our single individual of small-flowered maple is well hidden atop an ancient
stump behind a large A. mandschuricum (Section Trifoliata). Our collection
of butterfly maples is more numerous - with a number of wild collections
from Korea and China - although we have none from Japan, to date. UBC’s
accessions are of the subspecies koreanum (also known as var. rubripes), which
exhibits more brilliant red new growth than subsp. tschonoskii, the typical form.

The most interesting and problematic of the snake barks is the *A. pectinatum* complex, an assemblage that presumably represents a closely related, intergrading series of species (or subspecies) and forms from central China to the Himalayas and Vietnam. It includes the following subspecies: forrestii (Figure 8) (west China and Myanmar), taronense (back cover) (west China, Myanmar and Vietnam), pectinatum (Figure 9) (Himalayas from Nepal to Myanmar), laxiflorum (Figure 10) (west China), and maximowiczii (Figure 1) (northwest China). Many are beautiful and make excellent subjects for smaller gardens, but there is often uncertainty regarding their correct identification. This can be explained by the prevalence of nursery-sourced plants under these names, which are often grown from garden-collected (hence, potentially hybrid) seed. Another source of confusion is the similarity of the taxa themselves; in some taxa the differences appear to be of degree, rather than of character. There are currently ten documented wild accessions of this group in the Asian Garden. It is probably premature to give them more than provisional names, as some of the accessions are still exhibiting strictly juvenile foliage, which may change significantly as they mature.

The Botanical Garden continues to acquire wild origin maples and to test the hardiness limits of species that are rare in cultivation. We await the availability of the western Himalayan *A. sikkimense* and its subspecies metcalfii, for example. Other Asian snake barks missing from the collection include *A. davidii* subsp. grosseri (north and central China), *A. laisuense* (northwestern Sichuan) and *A. tschonoskii* subsp. tschonoskii (Japan). Completing the collection of snake barks is one of the garden’s goals; however, its completion isn’t seen as an end in itself. UBC Botanical Garden and Centre for Plant Research will be able to make more significant contributions to knowledge of this group when the entire geographical range is considered and the full extent of variation can be studied. This necessitates an expansion of the collection of snake barks to multiple collections of known wild origin for all of the species we can accumulate and grow. Beyond the scientific benefits, we can look forward to new introductions of these beautiful plants to cultivation and an even greater visitor experience at the garden.

1 There are specimens of nursery-sourced *A. pensylvanicum* on the UBC campus.
2 Geographic ranges are approximate. The literature is often contradictory on ranges of maple taxa.
Appendix: Acer Section Macrantha at UBC Botanical Garden

Names below are currently accepted species according to the Royal Horticultural Society. Following each name is the geographic distribution, or if wild source seed, the collector number and approximate collection locality, and finally, the UBC Botanical Garden accession (unique accession number - source code - date of accession).

A. capillipes (Japan) 012825-0317-1976
A. capillipes (Japan) 015357-0104-1978
A. caudatifolium ETOT 0054 (near Chiayang, Taiwan) 030832-0049-1993
A. caudatifolium ETOT 0021 (2220 m, Taichung, Taiwan) 030852-0049-1993
A. crataegifolium WH 0737 (Japan) 027412-0545-1988
A. crataegifolium WH 0908 (Japan) 027467-0545-1988
A. davidii (central China) 015359-0104-1978
A. davidii SABE 0517 (1300m, Hubei) 022937-0049-1993
A. davidii SABE 0536 (1000m, Hubei) 022938-0083-1983
A. davidii SABE 0679 (Qiujiaiping, Hubei) 022939-0083-1982
A. davidii APW 0074 (1050m, Guizhou) 030835-0413-1995
A. davidii APW 0071 (1020m, Guizhou) 031659-0413-1995
A. davidii SICH 0630 (Minya Konka, Sichuan) 030257-0571-1992
A. davidii 'Ernest Wilson' 025258-0538-1986
A. micranthum (Japan) 017988-0317-1979
A. morifolium YUKAWA 99-74 (Yakushima, Japan) 035507-5051-2000
A. pectinatum subsp. forrestii SEH 68 (China) 035480-0166-2000
A. pectinatum subsp. forrestii HM 1500 (China) 026482-0497-1988
A. pectinatum subsp. forrestii SICH 1245 (2800m, Sichuan) 030849-0571-1993
A. pectinatum subsp. forrestii SICH 1389 (3505m, Sichuan) 032171-0571-1995
A. pectinatum subsp. forrestii SICH 1461 (2750m, Sichuan) 032172-0571-1995
A. pectinatum subsp. laxiflorum SICH 0025 (2320m, Sichuan) 028860-0571-1990
A. pectinatum subsp. maximowiczii SICH 0200 (2640m, Sichuan) 029054-0571-1990
A. pectinatum subsp. maximowiczii (northwest China) 000482-0050-1969
A. pectinatum subsp. pectinatum KR 1240 (Bhutan) 027416-0523-1987
A. pectinatum subsp. taronense KR 2680 (3150m, Yunnan) 031586-0523-1994
A. pectinatum subsp. taronense KR 3976 (3275m, Yunnan) 033874-0523-1997
A. rubescens ETOT 158 (Taiwan) 030912-0049-1993
A. rubescens Taiwan BG (2420m, Taiwan) 034576-0463-1998
A. rufinerve (Japan) 017987-0055-1979
A. tegmentosum (Manchuria, Russia) 024614-0420-1985
A. tegmentosum CBS 0016 (Changbaishan, Jilin) 034831-0626-1997
A. tschonoskii subsp. koreanum Kwanak Arb (Mt. Kwanak, South Korea) 021090-0386-1981
A. tschonoskii subsp. koreanum Chollipo Arb (Mt. Odae, 750m, South Korea) 031704-0348-1991
A. tschonoskii subsp. koreanum CBS 00028 (Changbaishan, Jilin) 034832-0626-1997
A. tschonoskii subsp. koreanum (South Korea) 034906-0598-1999
A. × conspicuum ‘Silver Vein’ (A. pensylvanicum ‘Erythrocladum’ × A. davidii ‘George Forrest’) 022840-0013-1983
Climatological Data 2002

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Location: 49° 15’ 29” N, 123° 14’ 58” W
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University of British Columbia, Vancouver, BC, Canada