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Selection and Budding Propagation of Native Bigtooth Maple for Water-conserving Landscapes

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SUMMARY. The potential of bigtooth maple (*Acer grandidentatum*) as a small, water-conserving landscape tree for the western United States is limited by the selection of superior accessions from a morphologically diverse gene pool and the ability to propagate wild plants in a nursery environment. Superior accessions were selected based primarily on red fall color. Aerial digital images taken during peak fall color in 2007 and 2008 were synchronized with flight global positioning system (GPS) track files using digital image editor software and visually compared with corresponding satellite images to determine the exact latitude and longitude of selected trees on the ground. Trees were physically located using GPS technology then visually evaluated for initial selection. Criteria included fall color, habitat, relative disease and insect resistance, bud quality, and plant form. From 56 observed trees of interest, six were selected for propagation. Through time-course experiments using multistemmed, bigtooth maple seedling rootstocks in a coppiced stoolbed, the optimum time for chip budding scions of wild accessions in northern Utah was determined to be July through mid-August. Further evaluation of accessions for use in the landscape industry is required.

Most of the intermountain western United States between the Sierra Nevada and Rocky Mountain ranges is semi-arid to arid high desert with precipitation increasing with elevation, and with cold hardiness zones of 6 or lower. Continued population growth and water demand in the face of limited water resources is forcing the adoption of water conservation, especially during periods of drought.

Since as much as 50% to 60% of municipal water use is for urban landscaping (Kjelgren et al., 2000), landscape water conservation in the region is a high priority. Long-term conservation will require low water use landscaping (St. Hilaire et al., 2008), consisting of hardscaping, improved irrigation scheduling, and drought-tolerant plants. Deciduous trees are essential functional (shade, cooling) and design elements for high desert urban landscapes, but few species are tolerant to drought, cold temperatures, and alkaline soils.

Selecting existing wild plants that are drought tolerant, both cold hardy and resistant to deacclimation (Arora and Rowland, 2011), adapted to a range of soil pH and alkalinity, and resistant to insects and diseases would be desirable. Aesthetic traits

such as small size, unique forms, moderate growth rate, and red fall foliage (Guilford and Smith, 1959; Iles and Vold, 2003) are also highly desirable.

Native intermountain western United States deciduous tree species offer a potential pool of plants for ornamental landscape use, but assessing and selecting desirable native trees in general for landscape use is difficult, especially in remote areas. Remote sensing through photography or satellite images can be an efficient means of identifying promising populations or individual trees, particularly when assessing deciduous trees during peak fall color (Key et al., 2001) and then evaluating identified trees on the ground. True-color aerial photographs have also been shown to be a good means of mapping forest habitat (Balice, 1979).

Bigtooth maple is a native species that has combined both environmental tolerance and good landscape traits. It is native to 10 western states with a large population throughout northern Utah and southern Idaho (elevations of 4300–9200 ft). Its small size, form, and desirable fall color that make it a logical choice for use in water-conserving western landscapes (Barker, 1974, 1975; Kuhns, 2003; Tankersley and Emimo, 1981) including a deciduous habit (Eastmond, 1968), temperature hardiness [–30 to 100 °F (Kuhns, 2003)], drought tolerance (15–20 inches of annual precipitation), and adaptability to a wide range of soils and habitats. It has a wide range of forms and fall foliage colors, and while susceptible to a number of disease and insect pests, none appear debilitating enough to reduce the potential of bigtooth maples as a landscape tree (Mee et al., 2003).

Bigtooth maple is uncommon in the nursery trade and in urban landscapes. Rocky Mountain Glow® (*Acer grandidentatum* ‘Schmidt’) is the only

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Units

To convert U.S. to SI, multiply by	U.S. unit	SI unit	To convert SI to U.S., multiply by
0.3048	ft	m	3.2808
3.7854	gal	L	0.2642
2.54	inch(es)	cm	0.3937
25.4	inch(es)	mm	0.0394
48.8243	lb/1000 ft ²	kg·ha ⁻¹	0.0205
1.6093	mile(s)	km	0.6214
(°F – 32) ÷ 1.8	°F	°C	(°C × 1.8) + 32