'Firefall'TM Freeman Maple

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Freeman maples (*Acer ×freemani* E. Murray) are interspecific hybrids of red maple (*Acer rubrum* L.) and silver maple (*Acer saccharinum* L.) (Bachtell, 1988; Freeman, 1941). Over the past decade, cultivars of freeman maple have become increasingly popular landscape trees because they purportedly combine the attractive form, flowers, and foliar characteristics of superior red maple genotypes with the faster growth rate and broader environmental adaptability of silver maple (Bachtell, 1988). However, when planted in USDA zone 4a (United States National Arboretum, 2003), many of the commercially available cultivars of freeman maple fail to develop an attractive fall foliage display before the occurrence of a killing frost. Although the pedigrees of these cultivars are unknown (Santamour, 1993), their poor fall color display in northern regions is likely related to their more southerly provenances. In trials in Maryland, red maple seedlings from northern provenances typically colored earlier in the fall than those of more southerly origin (Townsend and Douglass, 1998). Controlled hybridization of superior red maple genotypes of far northern provenances with hardy silver maples could be expected to yield freeman maple seedlings suitable for northern regions of the country both in terms of fall color display and cold tolerance. A breeding program to create such hybrids was initiated at the University of Minnesota in 1990. This article describes a new freeman maple cultivar named 'AF#1' ('Firefall') resulting from this effort, which consistently developed earlier fall color and exhibited more cold hardiness in controlled laboratory tests than other freeman maple cultivars tested.

Origin

Controlled pollinations were made at the University of Minnesota Landscape Arboretum in Chanhassen in April 1990 between 'Beebe', a cut-leaf form of silver maple (the female parent) and 'Autumn Spire' red maple (the male parent), an earlier University of Minnesota

Fig. 1. Three 8-year-old 'Firefall' freeman maples grown in Chanhassen, Minn. (photographed September 1998).

introduction that originated near Grand Rapids, Minn., in USDA zone 3b (McNamara and Pellett, 1993). Mature fruits from this cross were collected in May 1990, germinated in flats in the greenhouse, and grown on in containers outdoors for one year. The seedlings were transplanted to a field trial in Chanhassen in 1992, and evaluated for form, cold tolerance, quality and timing of fall leaf coloration. Initial selections were clonally propagated by softwood cuttings in 1994 and distributed to cooperators in Iowa, Minnesota, Oregon, and Manitoba, Canada. The numbered selection 'AF #1' was selected for its cold hardiness, symmetrical form, seedlessness, and consistently early and attractive fall color display. The cultivar was trademarked 'Firefall' and officially released to wholesale nurseries in 2001.

Description

'Firefall' has an upright oval form with a strong central leader (Fig. 1). Branches ascend from the main trunk at an average angle of about 50 degrees. The trunk and main branches are light gray (RHS 201D) (Royal Horticultural Society, 1995). Fall color of the current year's stem growth is brownish-red (RHS 178B). Dormant vegetative buds are reddish

Fig. 2. (left to right) Summer leaves of 'Autumn Spire' red maple, 'Firefall' freeman maple, and 'Beebe' silver maple.

Fig. 3. Juvenile (left) and mature leaves of 'Firefall' freeman maple illustrating typical variation in leaf morphology that occurs on this cultivar.

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Fig. 4. Fall foliage of *Acer xfreemanii* 'Firefall' freeman maple.

Table 1. Lowest survival temperatures (°C) of red, silver, and freeman maple cultivars growing at the University of Minnesota Landscape Arboretum in Chanhassen (USDA hardiness zone 4a; 44° 59' N) in 2000–01. Values represent the mean of the lowest temperatures at which individual stem samples exhibited no injury (n = 6).

Cultivar ^z	Collection date						
	12 Oct.	13 Nov.	14 Dec.	18 Jan.	20 Feb.	21 Mar.	19 Apr.
Freeman maples							
AF #1	–20	–38	–46	–46	–43	–39	–25
AF#2 (sibling of AF #1)	–21	–39	–48 ^y	–50	–45 ^y	–39 ^y	–27
Celzam	–20	–34	–41	–40	–42	–27	–22
DTR 102	–20	–34	–44	–42	–40	–30	–18
Jeffersred	–20	–32	–44	–41	–41	–28	–19
Marmo	–20	–34	–42	–39	–40	–31	–27
Red maples							
Autumn Spire	–25	–38	–44	–47	–45	–39 ^y	–27
Brandywine	–22	–33	–38	–36	–39	–29	–21
Northwood	–21	–36	–43	–44	–44	–39 ^y	–27
Sun Valley	–19	–31	–38	–35	–36	–28	–8
Silver maples							
Beebe	–20	–37	–47	–47	–45 ^y	–34	–27

^zAF #1 = Firefall; Celzam = Celebration; DTR 102 = Autumn Fantasy; Jeffersred = Autumn Blaze.

^yNo injury detected in samples at lowest test temperature.

purple (RHS 187D). Staminate flowers with reddish-brown (RHS 53B) anthers typically emerge in early to mid-April in Chanhassen. This cultivar lacks female flower parts and no seed has ever been observed on the original tree or any clonal offspring.

Leaf shape is variable but is typically intermediate to those of the parents (Fig. 2). Mature leaves have three main lobes with two smaller, subtending lobes, a rounded to acute

base, doubly serrate margins and palmate venation (Fig. 3). Sinuses are irregular, ranging from lobed to cleft. Juvenile leaves have wider and deeper sinuses, wavier margins, and more pronounced marginal serrations than mature leaves (Fig. 3). Leaf blades average 12.7 cm long by 12.2 cm wide. Average petiole length is 8.5 cm. In summer, the adaxial leaf surface is medium green (RHS 147A) and glabrous and the abaxial surface is silver green (RHS

191B) and glabrous. Peak autumn foliage color is predominantly red (RHS 180A), ranging from RHS 44A to RHS 179B (Fig. 4).

Performance

'Firefall' is well adapted to northern climates. In controlled laboratory freezing tests conducted as described previously (McNamara et al, 2002), 'Firefall' cold acclimated earlier

in the fall, developed greater midwinter hardiness, and deacclimated later in the spring than a number of other red and freeman cultivars in Chanhassen (Table 1). It is completely cold hardy in USDA Zone 4 and appears to possess sufficient hardiness for portions of Zone 3. Some twig dieback was reported on young trees growing in a field production nursery in Portage la Prairie, Manitoba, USDA Zone 3b, (Rick Jurand, Jeffries Nursery; personal communication). The cultivar has been successfully grown in Minnesota, Iowa, and Oregon.

'Firefall' has consistently developed an attractive fall foliage display in late September or early October in Chanhassen, 1 to 3 weeks before other freeman maple cultivars. The early coloration of 'Firefall' is advantageous because it is more likely than other cultivars to produce an attractive display before the occurrence of a killing frost. The cultivar has also colored well in Oregon and Iowa. However, based upon the performance of other cultivars of northern provenance (Sibley et al., 1995), 'Firefall' may not color well in the southern United States.

This cultivar exhibits a moderately rapid growth rate. In Chanhassen, the average height after 9 years of five 2-year-old ramets planted 4.6 m apart in a 2-m-wide, clean-cultivated row with grass aisles was 9.4 m with a trunk diameter at breast height (1.37 m above the ground) of 13.0 cm. 'Firefall' grows best in full sun on moist, well-drained, slightly acidic

soils, but is fairly tolerant of wet and dry soils with pHs as high as 7.3. The cultivar's ability to tolerate more alkaline soil conditions is unknown.

'Firefall' is a valuable new tree for northern climates that combines excellent fall color, exceptional cold hardiness, a symmetrical form, and seedlessness. The cultivar can be used as a specimen shade tree for residential lawns, parks, golf courses, and commercial landscapes. Due to its large mature size, it is not suitable for use in narrow sidewalk plantings or under power lines.

Propagation

'Firefall' can be propagated from softwood cuttings collected in early summer (June in central Minnesota), treated with a 5-s quick dip in 8000 mg·L⁻¹ indolebutyric acid in 50% ethanol, stuck in a 2:1 (v/v) mixture of coarse perlite and peatmoss and placed under intermittent mist at air temperatures of 22 to 27 °C. Cuttings typically root within 5 to 8 weeks.

Availability

The University of Minnesota trademarked the name 'Firefall' for this cultivar in 2001 and applied for a plant patent in 2003. The cultivar was officially released to licensed wholesale nurseries in 2001 and cannot be reproduced without a licensing agreement and payment

of royalties. Trees will be available from the following nurseries in 2005:

J. Frank Schmidt and Son, Inc., 9500 S. E. 327th Avenue, Boring, OR 97009.

Speer and Sons Nursery, Inc. 18546 Arbor Grove Road, Woodburn, OR 97071.

Literature Cited

- Bachtell, K.R. 1988. *Acer xfreemanii*—A source for new shade tree selections. IPPS—Eastern Reg. p. 509–514.
- Freeman, O.M. 1941. A red maple, silver maple hybrid. J. Hered. 32:11–14.
- McNamara, S. and H. Pellett. 1993. *Acerrubrum* 'Autumn Spire'. J. Environ. Hort. 11:147–148.
- McNamara, S., H. Pellett, M. Florkowska, and O. Lindstrom, Jr. 2002. Comparison of the cold hardiness of landscape tree and shrub cultivars growing at two disparate geographic locations. J. Environ. Hort. 20:77–81.
- Royal Horticultural Society. 1995. The RHS colour chart. Royal Hort. Soc., London.
- Santamour Jr., F.S. 1993. Freeman maple—Illusion and truth. J. Arboricult. 19:195–199.
- Sibley, J.L., D.J. Eakes, C.H. Gilliam, G.J. Keever, and W.A. Dozier, Jr. 1995. Growth and fall color of red maple selections in the southeastern United States. J. Environ. Hort. 13:51–53.
- Townsend, A.M. and L.W. Douglass. 1998. Evaluation of various traits of 40 selections and cultivars of red maple and freeman male growing in Maryland. J. Environ. Hort. 16:189–194.
- United States National Arboretum. 2003. USDA 1990 plant hardiness zone map. <http://www.usna.usda.gov/Hardzone>.