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Evaluation of Flowering Ash in Wichita, Kansas[1,2]

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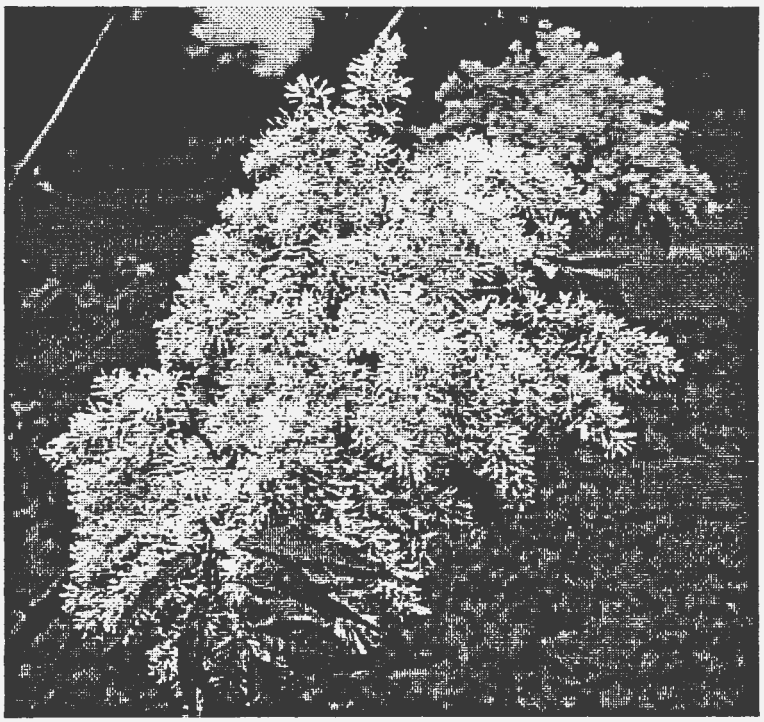
Flowering ash *(Fraxinus ornus* L.) is native to southern Europe and western Asia. At maturity, this ash is an oval-headed tree with glossy, dark green leaves, which grows to about 50 feet (15 meters) tall. Its most notable feature appears in May: showy panicles of fragrant, cream-colored flowers, which help make this species a popular street and park tree in those regions where it is winter hardy. Dirr (1983) notes that it is hardy to -10°F (-23°C) and, similarly, it is listed for USDA Hardiness Zone 6 in Hortus Third (1976). A seedling population of flowering ash, PI 385252, from Bosnia & Herzegovina was evaluated at eleven sites in USDA Hardiness Zones 3b to 6a across the north-central United States from 1976 to 1986 (Widrlechner et al., 1992), but only one of 32 trees survived the trial and the above ground portions of the single survivor were repeatedly killed to the base.

In 1987, we initiated an experiment to evaluate flowering ash populations at Wichita, Kansas, one of the harshest sites at which some trees could be expected to reach reproductive maturity. This experiment had three objectives: (1) to determine whether particular seedling populations of flowering ash might possess sufficient cold hardiness for direct use in Wichita and nearby regions; (2) to identify individual trees with superior aesthetic



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[1] Revision of Report of Progress 95-111-2 of the Kansas Agricultural Experiment Station, Manhattan, KS.

[2] The authors thank William Graves, Philip Koch, and Harold Pellett for their useful critiques of this manuscript.

Table 1. Winter injury and flowering evaluations of flowering ash

Origin	Accession #	#Tested[a]	Winter Injury[b] 1988	1989	1994	Peak Flowering Date
Poland	Ames 4340	20/11	7.3	9.0	6.9	6-13 May 1994
Czech Republic	Ames 4345	33/13	5.8	6.0	6.6	8-20 May 1994
Croatia	PI 407341	57/11	6.0	8.8	5.6	6 May 1994
Slovenia	PI 407344	36/12	6.0	8.1	5.7	4-10 May 1994

[a] First number indicates the number of seedlings field-planted in 1987 and the second indicates the number that were transplanted in 1991.

[b] Mean winter injury observed during the spring of the year listed, based on a scale of 0 to 9, with 0 = dead and 9 = no visible injury.

characteristics and propagate them for wider testing; and (3) to produce an intermating population of the hardiest trees for seed production and possible selection for increased hardiness.

Four flowering ash populations were obtained through the U.S. National Plant Germplasm System (Table 1). Sources for these populations included native stands from Mount Strahinščica near Krapina, Croatia, and Mount Sneznik near Ilirska Bistrica, Slovenia, and cultivated specimens from botanical gardens in Poland and the Czech Republic. The populations were chosen because these sites experience somewhat lower mid-winter temperatures than those typical over much of the native range of this species. Seeds were germinated by the junior author early in 1987, and transplants growing in quart containers were lined out into nursery rows at the Horticultural Research Center in Wichita, Kansas, on 15 September 1987.

Nearly all seedlings survived the mild winter of 1987-88, although some stem and bud injury did occur, especially to accessions from Croatia, Slovenia, and the Czech Republic (Table 1). In general, robust plants set terminal buds early enough to avoid winter injury. However, Ames 4345 from the Czech Republic exhibited both good vigor and a late flush of growth that did not harden properly, leading to winter injury. After another relatively mild winter in 1988-89, little injury was observed in the spring, except for Ames 4345 (Table 1).

The winter of 1989-90 was exceptionally harsh, reaching -18°F (-28°C) on 22 December. All seedlings were severely injured or killed. Those survivors from each population with the most surviving buds and well-developed root systems were transplanted into another field with a completely randomized design at a 10 X 10 foot (3 X 3 meter) spacing on 10 April 1991. From 11 to 13 trees of each accession, comprising a total of 47 trees, were selected for the new planting.

During the spring of 1994, 21 of the selected trees reached reproductive maturity (see Table 1 for flowering dates). Ten pistillate trees produced seeds, making them useful for breeding but undesirable as street trees. The other eleven were staminate and will be evaluated for clonal selection and possible cultivar release if they exhibit sufficient ornamental merit. Inflorescences varied widely in size and overall attractiveness (see photos for attractive examples), but it is premature to judge floral display in these trees. In addition, some trees

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displayed dark-purple leaf color during the fall of 1993.

Although none of these seedling populations was suitable for direct use in Wichita, we will continue to evaluate these trees for hardiness and ornamental merit. Open-pollinated seedlings resulting from this planting may combine different sources of cold hardiness present among source populations. These seedlings will be evaluated in Wichita, Kansas, and Ames, Iowa, and possibly at other sites in the future for adaptation to local conditions.

References

Dirr, Michael A. 1993. Manual of Woody Landscape Plants (3rd ed.). Stipes Publ., Champaign, IL.

Hortus Third. 1976. Macmillan Publ., New York.

Widrlechner, Mark P., Edward R. Hasselkus, Dale E. Herman, Jeffery K. Iles, John C. Pair, Ellen T. Paparozzi, Robert E. Schutzki, and David K. Wildung. 1992. Performance of landscape plants from Yugoslavia in the North Central United States. J. Environ. Hort. 10: 192-198.

Landscape Tree Evaluation in the Intermountain West

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High-desert environmental conditions in the Intermountain West are limiting to growth of shade trees. Winters can be quite cold, hardiness zones range from 3-5, but in addition, soils are alkaline and can reach above 9. Bark damage on the southwest side due to intense winter sun can be a problem on smooth-barked trees. Iron chlorosis from high pH can preclude the use of many species that are otherwise hardy. Since this region is a desert, rainfall in most locations is insufficient to support large trees and irrigation is necessary. Another aspect of deserts that can limit growth but is infrequently addressed is the low humidity. When humidity gets too low, plant stomata start to close to limit transpiration, but it also limits photosynthesis and drives leaf temperatures above optimal range, increasing respiration. This humidity response may be one of the major reasons why broadleaf shade trees from temperate regions of the east never get as large in the mountain west as they do in their native habitat.

At Utah State University we are evaluating how a wide variety of shade tree species and cultivars perform under these environmental stresses of the Intermountain West. Following are some anecdotal evaluations of 1-2 individuals of several species that I have been observing the past several years during which it has gotten close to -30°F at some point every year. In the future I will report on replicated trials.

Taxodium distichum: 2 individuals, 1" caliper, have survived down to -30° F the past several winters with only some tip die-back. They are from a southern Illinois seed source. Both trees have required surface-applied iron chelate to correct severe chlorosis, but one application seems to last