

SELECTING TATTER AND SCORCH RESISTANT SUGAR MAPLES

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Sugar maples (*Acer saccharum* and its various subspecies) grow over a wide geographic range from New England to the southwest (2). In 1983, at the Kansas State University Horticulture Research Center, Wichita, KS, a trial was initiated to compare numerous selections to determine their adaptability to the great plains environment. Included also was the black maple, *A. nigrum* which grows along the western edge of the native range of sugar maple in Iowa and Caddo maple, a southern ecotype of *A.s.* subsp. *saccharum*, from a disjunct population native to Oklahoma (1). The objective of the trial was to compare growth, tolerance to summer stress and other ornamental characteristics including fall color and to select cultivars best suited for use in exposed sites.

The site selected was a silt loam soil in an open, exposed site subject to full sun and wind. Bareroot trees approximately 5 to 6 feet tall were obtained from commercial nurseries except the Caddo maples which were grown from seed collected three years earlier in the Red Rocks Canyon area near Hinton, OK. Planted on April 23, 1983 the trees were mulched and irrigated regularly until well established. In recent years no irrigation has been supplied despite numerous, severe dry periods. In spite of severe leaf scorch on some cultivars no trees have been lost due to drought.

Leaf tatter is a term gaining acceptance to describe the interlobal tearing of leaves that results from a combination of environmental factors. Leaf scorch, in contrast, describes the desiccation of leaf margins due to drought stress. Tatter and scorch were evaluated visually, but the moisture status was measured by a pressure bomb and expressed as xylem water potential.

Selections which proved significantly more tolerant of climatic stresses were cultivars Commemoration and Legacy plus Caddo maple from Oklahoma (Table 1). Caddo maples also grew more in height and caliper over a 10 year period. These three selections exhibited much better leaf qualities than other cultivars which showed various degrees of leaf deterioration, perhaps attributable to their origin from a more sheltered environment of eastern north America.

Higher water potentials (less negative values) of the Caddo maples under severe drought conditions substantiate their adaptation to the plains. This southern ecotype and Legacy both have a much smaller leaf size than those of Green Mountain, which has long petioles and a greater leaf surface (Fig. 1). Such trees have the potential of allowing sugar maple to survive stressful inner city planting areas where drought, wind and shade provide difficult planting sites for urban trees. Being of southern origin the excellent fall color of Caddo maple develops late; therefore it is suggested for use in more southern latitudes of the United States.

Literature Cited

- Dent, Thomas C. and Robert P. Adams. 1983. Relationships of two isolated groups of sugar maples (*Acer saccharum* Marshall ssp *saccharum*) in west central Oklahoma to eastern and western species. *Rhodora* 85:439-456.
- Simpson, Benny J. and Billy W. Hipp. 1993. Maples of the southwest. *Am Nurs.* 177(5):26-35.

Table 1. Leaf tatter, xylem water potential and scorch of sugar maple selections.

	Tatter" 9-3-90	Xylem water (MPa)		Scorch ^{2/} 9-20-91
		Pre-dawn 9-4-91	Mid-day 9-4-91	
<u>Acer saccharum</u>				
<i>Bonfire</i>	23.0 e	-1.10 bcd	-1.45 ab	6.2 bc
<i>Commemoration</i>	8.0 ab	-0.96 cd	-1.91 a	7.3 ab
<i>Legacy</i>	3.2 a	-0.80 de	-1.32 ab	8.6 a
<i>Green Mountain</i>	22.0 de	-1.54 a	-1.64 a	4.4 d
<i>Fairview</i>	31.0 f	-1.14 bcd	-1.45 ab	5.3 cd
<i>Wright Brothers</i>	34.0 f	-1.34 abc	-1.73 a	5.4 cd
<i>Endowment</i>	14.0 bc	-1.02 bcd	-1.72 a	4.7 cd
<i>Caddo</i>	6.8 a	-0.54 e	-0.84 b	8.8 a
<u>A. nigrum</u> (sdlgs.)	16.0 cd	-1.30 abc	-1.71 a	6.1 bcl
<i>Green Column</i>	16.0 cd	-1.30 abc	-1.84 abc	5.8 cd

^{1/} Expressed as percent of leaf area affected. Numbers in a column followed by a common letter are not significantly different at the .05 level (mean of 5 replications).

^{2/} Leaf scorch rated on a scale of 0-9 with 9 = least scorch.



Fig. 1. Leaf comparisons of Legacy (left), Green Mountain (center) and Caddo maple (right) shown one-half actual size.