

BREEDING MAPLES: EXPLORING THE POSSIBILITIES FOR COMBINING SMALL STATURE AND HARDINESS

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The creation of interspecific hybrids within the maple genus offers considerable potential for filling the need for stress-tolerant small trees. Over half of the 124 species recognized in the latest taxonomic treatment of the genus (van Gelderen et al., 1994) mature at 10m (33ft) or less in height. Although a few (e. g., *Acer ginnala*) are found in exposed, droughty sites from northern locations, many others are more tender understory species of mesic forests. The intraspecific variation in adaptability of the vast majority of these small tree species to environmental stresses, however, is virtually unknown and insufficient material is currently available to evaluate them. Many of these species have either not been introduced into North America or are known only from a very few individuals growing in arboreta.

A considerable body of knowledge of the intraspecific variation of larger sized maple species exists. Tolerances to a large number of environmental stresses are found among them. These tolerances (and considerable aesthetic merit) have made maples one of the most extensively planted and successful genera for tough urban sites and rural shelterbelts.

The goal of this study is to investigate the crossability within and among as many of the 16 sections of the maple genus as possible. Information available from crossability work on timber species within the genus indicate that, as expected, crosses within sections have the greatest probability of success, but crosses between species from different sections have also been reported as successful. As small-statured species occur in all but one of the sections, the possibility of finding a number of successful combinations appears promising.

Plant material from the Morris Arboretum, Philadelphia, PA, the Arnold Arboretum, Jamaica Plains, MA, the Holden Arboretum, Mentor, OH, and the Morton Arboretum, Lisle, IL were used in the study. Use of these combined genetic resources increased the number of species and number of individuals of each species which could be included in the study. The different bloom dates of the materials at the various locations also allowed for the circumvention of some problems arising from the complex logistics of pollen collection and limited duration of pollen viability - also increasing the number of crosses which could be attempted.

The various crosses attempted during the spring of 1994 are listed in tabular form on the following page. Additional combinations will be attempted in subsequent years, as well as repetition of the same crosses. Initial crossing success is merely the first step in the long process of developing hardy, small-statured trees. Little is known about the inheritance of many of the traits involved, but the necessity of a second generation is anticipated before small stature can be recovered.

Table 1. Controlled maple crosses attempted spring 1994; females below and males to the right. Classification follows (van Gelderen, et al., 1994.

(* max. mature height 10m)

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<i>Acer cissifolium</i> *	na	self	
<i>A. circinatum</i> *			
<i>A. pseudosieboldianum</i> *			
<i>A. griseum</i>	x		
<i>A. campestre</i> *	x		
<i>A. miyabei</i>	x		
<i>A. platanoides</i>			
<i>A. truncatum</i> *	x		
<i>A. pectinatum</i> ssp. <i>forrestii</i> *	na		
<i>A. tegmentosum</i> *	na		
<i>A. tataricum</i> *	x		
	x	<i>A. rubrum</i>	Sect. <i>Rubra</i>
	x	<i>A. cissifolium</i> *	Sect. <i>Negundo</i>
	x	<i>A. henryi</i> *	
	x	<i>A. negundo</i>	
	x	<i>A. glabrum</i> *	Sect. <i>Glabra</i>
	x	<i>A. argutum</i> *	
	x	<i>A. carpinifolium</i> *	Sect. <i>Indivisa</i>
	x	<i>A. japonicum</i> *	Sect. <i>Palmata</i>
	x	<i>A. palmatum</i> *	
	x	<i>A. pseudo-sieboldianum</i> *	
	x	<i>A. sieboldianum</i> *	
	x	<i>A. griseum</i>	Sect. <i>Trifoliata</i>
	x	<i>A. triflorum</i> *	
	x	<i>A. campestre</i> *	Sect. <i>Platanoides</i>
	x	<i>A. miyabei</i>	
	x	<i>A. platanoides</i>	
	x	<i>A. truncatum</i> *	
	x	<i>A. buergerianum</i> '	Sect. <i>Integrifolia</i>
	x	<i>A. pensylvanicum</i>	Sect. <i>Macrantha</i>
	x	<i>A. rufinerve</i>	
	x	<i>A. tegmentosum</i> *	