

Final Year of Decade-long National Elm Trial

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Introduction

Although many Dutch elm disease-resistant elm cultivars are available in the nursery trade, much of the public is hesitant to purchase and plant any elm trees. In order to promote interest in planting these trees, scientific data on growth, form, and pest resistance for existing Dutch elm disease resistant elm cultivars are essential.

The National Elm Trial is a multi-state effort to evaluate and promote the use of commercially available Dutch elm disease resistant American and hybrid elms. Seventeen elm cultivars were planted in large replicated trials across the United States so their growth and performance could be evaluated. Public and private sites in 15 states are cooperating to evaluate these tree cultivars over a wide range of growing conditions and hardiness zones. The project is coordinated by William Jacobi and James Klett of Colorado State University and James Walla of North Dakota State University. Iowa State University is among the 15 state cooperators.

The objective of this research was to determine: 1) the growth and horticultural performance of commercially available Dutch elm disease resistant elm cultivars in various climate regimes in the United States, 2) the relative disease, insect, and abiotic stress tolerance of these cultivars, and 3) promote the propagation and use of elms through local, regional, and national reporting of the trial results to wholesale tree propagators and growers, retail nursery and garden center

operators, landscape designers, arborists, and the general public.

Materials and Methods

In 2005, elm cultivars 1–14 were planted in April. Varieties 15–16 were planted in May 2006 and variety 17 (Prairie Expedition) was planted in May 2007. Each cultivar is represented by one tree in each of five blocks in a randomized complete block (Figure 1). The elm cultivars represent a range of hybrids and species of *Ulmus* that are commercially available. The trial was conducted over a period of 10 years.

Annual assessments of each tree were made in October and include height, diameter, and crown characteristics. In addition, the presence of vascular diseases, canker diseases, foliar diseases, scale insect infestations, foliar-feeding insect infestations, bark beetle infestations, and abiotic damages (frost/freezing, wind, winter dieback, sunscald, and insufficient soil moisture) were noted.

Results and Discussion

Quantitative and qualitative observations are presented in Table 1. Recommendations were based on the arrangement and angles of branches, overall growth, and appearance of the tree. Leaf quality put Triumph Morton Glossy as a top recommendation. Another top recommendation was Morton Stalwart with the best growth in comparison to other cultivars. Other highly recommended cultivars included Vanguard Morton Plainsman because of its moderate angles and the twigs on branches are arranged opposite each other and horizontally on a flat plain, giving it an interesting ladder-like appearance in the fall and winter.

Patriot and Accolade Morton also were placed in the recommended list because of good growth and shape. Homestead, Pioneer,

Prospector, and New Harmony performed moderately well. Frontier and Emerald Sunshine are not recommended for Iowa because of narrow branch angles, which caused splitting of the main trunk. In addition, 3 of 4 surviving Frontier developed sunscald on the south side of the main trunk. Princeton

and Prairie Expedition also performed poorly in comparison with the other cultivars.

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Table 1. Cultivar, species, planting date, diameter at 1 ft from ground, breadth of crown, tree height, crown shape, and survival of replicates in October 2014.

Elm Cultivar	<i>Ulmus</i> species	Plant date	Dia. at 1 ft (in.) ^d	Crown breadth (ft) ^d	Height (ft) ^d	Crown (comments)	Survival (of 5)
Denada Charm	<i>U. japonica</i> X	2005	D	D	D	D	0
Morton Red Tip ^c	<i>U. wilsoniana</i>						
Triumph Morton	<i>U. pumila</i> X	2005	12.7 ab	28.2 ab	39.8 ab	Vase	5
Glossy ^a	<i>U. japonica</i> X <i>U. wilsoniana</i>						
Homestead	<i>U. glabra</i> X <i>U. carpinifolia</i> X	2005	10.3 bc	23.5 a-c	36.5 b-d	Columnar (small leaves)	4
	<i>U. pumila</i>						
Patriot ^b	(<i>U. glabra</i> X <i>U. carpinifolia</i> X <i>U. pumila</i>) X <i>U. wilsoniana</i>	2005	11.4 ab	29.0 ab	41.0 a	Pyramid	4
	<i>U. propinqua</i>						
Emerald Sunshine ^c	<i>U. propinqua</i>	2005	6.1 d	13.0 d	28.5 e	Vase (side shoots)	2
Commendation	<i>U. carpinifolia</i> X <i>U. pumila</i>	2005	14.0 a	30.8 a	37.2 a-d	Vase	5
Morton Stalwart ^a	X <i>U. wilsoniana</i>						
Vanguard Morton	<i>U. pumila</i> X	2005	12.7 ab	30.2 a	38.4 a-c	Vase (wide branch angles)	5
Plainsman ^a	<i>U. 67merican</i>						
Frontier ^c	<i>U. carpinifolia</i> X <i>U. parvifolia</i>	2005	8.1 cd	20.5 b-d	29.6 e	Conical sunscald	4
Pioneer	<i>U. glabra</i> X <i>U. carpinifolia</i>						
New Horizon ^c	<i>U. pumila</i> X <i>U. japonica</i>	2005	D	D	D	D	0
Accolade Morton ^b	<i>U. japonica</i> X <i>U. wilsoniana</i>						
Prospector	<i>U. wilsoniana</i>	2005	10.3 cd	22.6 a-c	33.8 d	Round	5
Valley Forge ^c	<i>U. americana</i>						
New Harmony	<i>U. americana</i>	2006	6.7 d	18.6 cd	35.4 cd	Columnar (narrow branch angles)	5
Princeton ^c	<i>U. americana</i>	2006	11.3 ab	27.5 a-c	37.3 a-d	Bouquet-like (no central leader)	4
Prairie Expedition ^c	<i>U. americana</i>	2007	6.5 d	23.5 a-c	28.0 cd	Vase (big leaves)	2

^aTop recommendations.

^bRecommended for Central Iowa.

^cNot recommended for Central Iowa

^dMeans in a column followed by the same letters are not significantly different ($P < 0.05$). D denotes dead.

□

1	National Elm Trial – Iowa 2011			Pioneer	Triumph Morton Glossy	Accolade Morton	New Harmony	Homestead
2			Commendation M. Stalwart	Accolade Morton	New Harmony		Prospector	Frontier
3			New Harmony			Frontier	Pioneer	Accolade Morton
4							Commendation M. Stalwart	
5			Patriot	Prospector	Vanguard M. Plainsman			Princeton
6			Prairie Expedition		CEDAR	Princeton	OAK	
7	Prairie Expedition	New Harmony	Vanguard M. Plainsman	Triumph Morton Glossy		Pioneer		
8	Pioneer	Prospector	Princeton	Frontier	Emerald Sunshine	Vanguard M. Plainsman	Accolade Morton	
9		Triumph Morton Glossy		BUCKEYE	Homestead	Patriot	Triumph Morton Glossy	Patriot
10		Commendation M. Stalwart			Prospector	Commendation M. Stalwart		
11	OAK		Homestead		Princeton	Frontier	New Harmony	Triumph Morton Glossy
12				Vanguard M. Plainsman	Commendation M. Stalwart	Prospector		Emerald Sunshine
13	Accolade Morton		Patriot	Homestead				Vanguard M. Plainsman
	1	2	3	4	5	6	7	8



Figure 1. Map of Elm Trial at the ISU Horticultural Station 2014.