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National Elm Trial

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National Elm Trial

Abstract

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 tree. 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.

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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 tree. 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 are being planted in large replicated trials in a wide range of conditions across the United States so that their growth and performance can be evaluated. Public and private sites in fifteen states are cooperating to evaluate these tree cultivars over a wide range of growing conditions and hardiness zones. The project is coordinated by Dr. William Jacobi and Dr. James Klett of Colorado State University and Dr. James Walla of North Dakota State University. Iowa State University is among the fifteen state cooperators

The objective of this research was to:

- 1) determine the growth and horticultural performance of commercially available Dutch elm disease resistant elm cultivars in various climate regimes in the United States;
- 2) determine 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, landscaper 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 will be 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/freeze, 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 health, and appearance of the tree. Leaf quality put Triumph Morton Glossy as the top recommendation. Vanguard Morton Plainsman and Commendation Morton Stalwart are also highly recommended. Vanguard Morton Plainsman has 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. 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 elms developed sunscald on the south side of the main trunk. Princeton and Prairie Expedition also performed poorly in comparison to the other cultivars. Homestead, Patriot, Pioneer, Accolade Morton,

Prospector, and New Harmony performed moderately well.

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Figure 1. Map of Elm trial at the ISU Horticulture Station 2011.

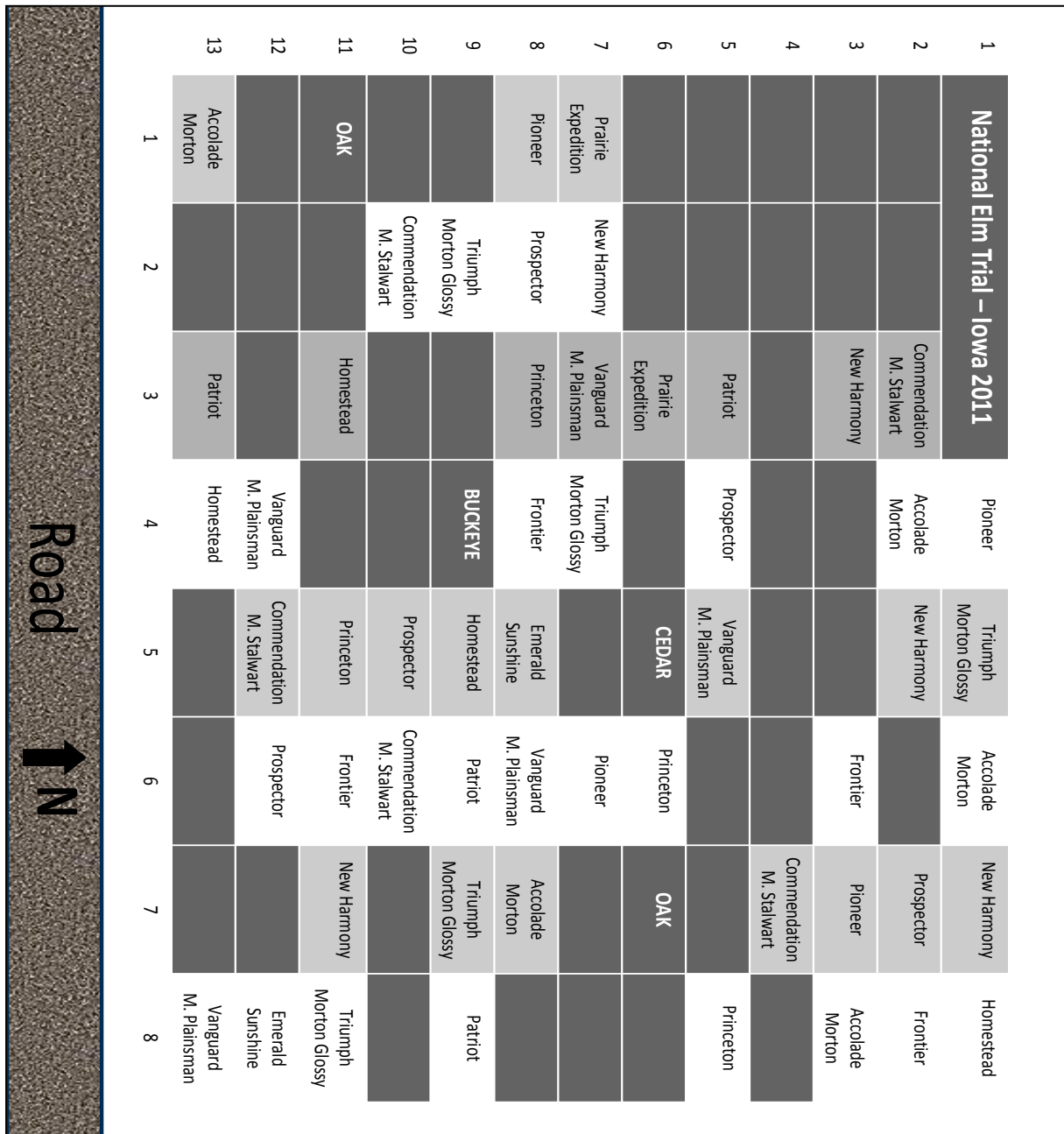


Table 1. Performance of cultivar species in the Iowa State University trials, 2011.*

Elm Cultivar	<i>Ulmus</i> species	Plant date	Diam at 1 ft (in.)**	Crown breadth (ft)**	Height (ft)**	Crown shape	Leaves	Cause of death or quality of trunk and branches	Survival (of 5 trees)
Denada Charm Morton Red Tip'	<i>U. japonica</i> X <i>U. wilsoniana</i>	2005	D	D	D	D	D	Three remaining trees split due to narrow branch angles	0
Triumph Morton Glossy	<i>U. pumila</i> X <i>U. japonica</i> X <i>U. wilsoniana</i>	2005	5.8 cb	21.4 cd	31.2 a	vase	Large, glossy, No leaf spots	Moderate angles	5
Homestead	<i>U. glabra</i> X <i>U. carpinifolia</i> X <i>U. pumila</i>	2005	5.1 b-d	19.3 c-e	29.0 a-c	oval	Small, thin canopy, anthracnose	Moderate angles	4
Patriot	(<i>U. glabra</i> X <i>U. carpinifolia</i> X <i>U. pumila</i>) X <i>U. wilsoniana</i>	2005	5.5 b-d	26.0 ab	31.0 ab	pyramid	Medium glossy leaves, no disease	Moderate to narrow angles, bacterial wetwood	4
Emerald Sunshine	<i>U. propinqua</i>	2005	8.6 a	11.5 g	24.5 de	Vase many side shoots	Large pubescent, no leaf spots	Two trees split due to narrow branch angles	2
Commendation Morton Stalwart	<i>U. carpinifolia</i> X <i>U. pumila</i> X <i>U. wilsoniana</i>	2005	6.1 b	27.4 a	29.2 a-c	round	Medium, glossy, no leaf spots	Some narrow angles, needs pruning.	5
Vanguard Morton Plainsman	<i>U. pumila</i> X <i>U. japonica</i>	2005	5.8 bc	25.2 ab	31.2 a	round	Small, thin canopy, anthracnose	Moderate angles, bacterial wetwood.	5
Frontier	<i>U. carpinifolia</i> X <i>U. parvifolia</i>	2005	4.6 c-e	13.0 fg	23.5 e	conical	Small, thin canopy, anthracnose, nice red/purple fall color	3 of the 4 remaining have sunscald on trunks	4
Pioneer	<i>U. glabra</i> X <i>U. carpinifolia</i>	2005	4.8 b-e	18.0 de	27.5 b-d	vase	Big leaves, mod. anthracnose	Some narrow angles.	4
New Horizon	<i>U. pumila</i> X <i>U. japonica</i>	2005	D	D	D	D	D	The single remaining tree died from sunscald.	0
Accolade Morton	<i>U. japonica</i> X <i>U. wilsoniana</i>	2005	5.1 b-d	17.4 e	27.0 c-e	round/vase	Large, glossy, no leaf spots	Moderate angles.	5
Prospector	<i>U. wilsoniana</i>	2005	5.4 b-d	23.0 bc	27.4 cd	round	Large, glossy, few leaf spots	Moderate angles, bacterial wetwood	5
Valley Forge	<i>U. americana</i>	2005	D	D	D	D	D	D	0
New Harmony	<i>U. americana</i>	2006	4.3 de	13.0 fg	27.0 c-e	pyramid	Large, glossy, few leaf spots	Some narrow angles, needs pruning	5
Princeton	<i>U. americana</i>	2006	5.1 b-d	16.5 ef	30.0 a-c	vase	Large, glossy, few leaf spots	Very narrow angles, splitting trunk	4
Prairie Expedition	<i>U. americana</i>	2007	3.7 e	15.5 ef	19.5 f	Round, assymetrical	Large, glossy, no leaf spots	Two trees split due to narrow branch angles	2

*Growth data taken in October 2011. **Means in a column followed by the same letters are not significantly different (P<0.05). D = dead.