1-1-2015

Final Year of Decade-long National Elm Trial

Jean Batzer
Iowa State University, jbatzer@iastate.edu

Mark Gleason
Iowa State University, mgleason@iastate.edu

Final Year of Decade-long 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 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.

Keywords
Plant Pathology and Microbiology

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences | Forest Biology | Horticulture | Natural Resources and Conservation

Final Year of Decade-long National Elm Trial

RFR-A1420

Jean Batzer, assistant scientist
Mark Gleason, professor/extension plant pathologist
Department of Plant Pathology and Microbiology

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/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 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.

Acknowledgements

We would like to thank Nick Howell and Lynn Schroeder for helping with orchard maintenance and also the 312 Bessey field crew for all of their hard work during 2014.

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	*Ulmus* species	Plant date	Dia. at 1 ft (in.)[d]	Crown breadth (ft)[d]	Height (ft)[d]	Crown (comments)	Survival (of 5)
Denada Charm	*U. japonica X U. wilsoniana*	2005	D	D	D	D	0
Morton Red Tip[c]							
Triumph Morton Glossy[a]	*U. pumila X U. japonica X U. wilsoniana*	2005	12.7 ab	28.2 ab	39.8 ab	Vase	5
Homestead	*U. glabra X U. carpinifolia X U. pumila*	2005	10.3 bc	23.5 a-c	36.5 b-d	Columnar (small leaves)	4
Patriot[b]	*(U. glabra X U. carpinifolia X U. pumila) X U. wilsoniana*	2005	11.4 ab	29.0 ab	41.0 a	Pyramid	4
Emerald Sunshine[c]	*U. propinqua*	2005	6.1 d	13.0 d	28.5 e	Vase (side shoots)	2
Commendation Morton Stalwart[a]	*U. carpinifolia X U. pumila X U. wilsoniana*	2005	14.0 a	30.8 a	37.2 a-d	Vase	5
Vanguard Morton Plainsman[a]	*U. pumila X U. 67merican*	2005	12.7 ab	30.2 a	38.4 a-c	Vase (wide branch angles)	5
Frontier[c]	*U. carpinifolia X U. parvifolia*	2005	8.1 cd	20.5 b-d	29.6 e	Conical sunscald	4
Pioneer	*U. glabra X U. carpinifolia*	2005	11.8 ab	29.5 ab	34.5 cd	Vase (Japanese beetles)	4
New Horizon[c]	*U. pumila X U. japonica*	2005	D	D	D	D	0
Accolade Morton[b]	*U. japonica X U. wilsoniana*	2005	11.7 ab	30.8 a	35.0 cd	Vase (nice shape)	5
Prospector	*U. wilsoniana*	2005	10.3 cd	22.6 a-c	33.8 d	Round	5
Valley Forge[c]	*U. americana*	2005	D	D	D	D	0
New Harmony	*U. americana*	2006	6.7 d	18.6 cd	35.4 cd	Columnar (narrow branch angles)	5
Princeton[c]	*U. americana*	2006	11.3 ab	27.5 a-c	37.3 a-d	Bouquet-like (no central leader)	4
Prairie Expedition[c]	*U. americana*	2007	6.5 d	23.5 a-c	28.0 cd	Vase (big leaves)	2

[a]Top recommendations.
[b]Recommended for Central Iowa.
[c]Not recommended for Central Iowa
[d]Means in a column followed by the same letters are not significantly different ($P < 0.05$). D denotes dead.

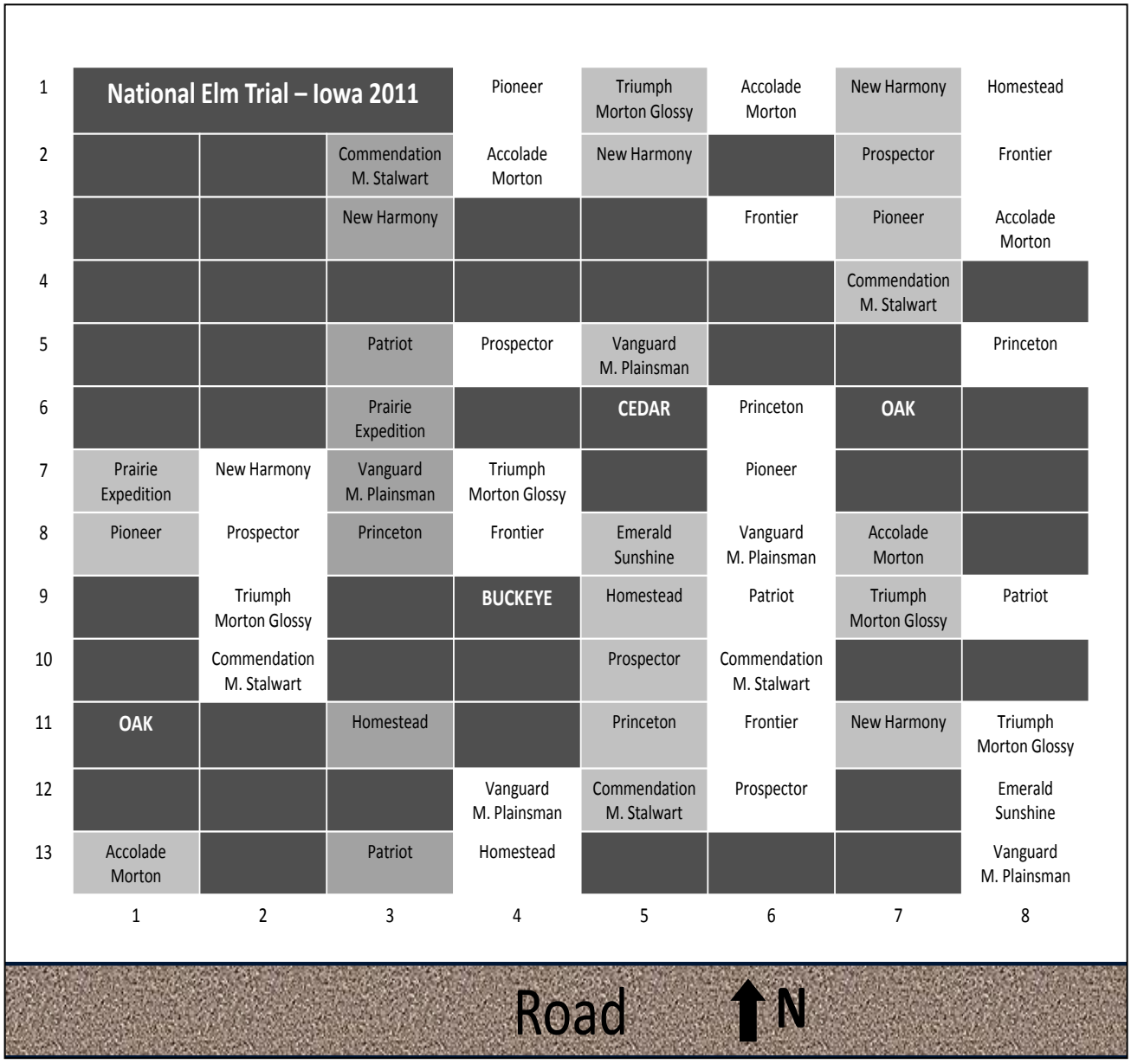

Figure 1. Map of Elm Trial at the ISU Horticultural Station 2014.