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# National Elm Trial Update for Iowa, 2007

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**Abstract**
The graceful American elm that once dominated urban forests across the United States has essentially disappeared from urban landscapes after the introduction of Dutch elm disease. This tragedy illustrates why it is essential to maximize genetic diversity within the nation's urban forests. Exotic pathogens and insects continue to threaten the health of our shade trees. Dutch elm disease-resistant elm cultivars could enhance the diversity as well as the beauty of urban forests. 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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## Introduction

The graceful American elm that once dominated urban forests across the United States has essentially disappeared from urban landscapes after the introduction of Dutch elm disease. This tragedy illustrates why it is essential to maximize genetic diversity within the nation's urban forests. Exotic pathogens and insects continue to threaten the health of our shade trees. Dutch elm disease-resistant elm cultivars could enhance the diversity as well as the beauty of urban forests. 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. Fourteen 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 is 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

Elm cultivars 1–14 were planted in April 2005. Varieties 15–16 were planted in May 2006 and variety 17 (Prairie Expedition) was planted May 2007. Each cultivar is represented by one tree in each of five blocks in a randomized complete block. 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.

Using a standard format, annual assessment of each tree includes height, diameter, crown characteristics, and fall color. At appropriate times during the year, each tree is assessed for response to vascular diseases, canker diseases, foliar diseases, scale insect infestations, foliar-feeding insect infestations, bark beetle infestations, and abiotic damage (frost/freeze, wind, winter dieback, sunscald, and drought).

## Results and Discussion

Elm cultivars differed in growth rate. Diameter at breast height ranged from 0.6 to 4.3 in. Height ranged from 6.2 to 23.4 ft and crown width ranged from 3.5 to 19.75 ft (Table 1). The cultivars all had very similar levels of leaf damage from anthracnose and insect feeding. No vascular or canker disease was observed. All of cultivar 2 (Elmer II Allee) died during establishment. Seven additional trees were lost

as a result of wind damage during the 2007 growing season and some were damaged while being staked up after having blown over.

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**Table 1. 2007 growth data* of elm trees planted in a randomized complete block.**

| Elm | Cultivar | Ulmus species | Planting date | Diam (in) | Height (ft) | Crown width (ft) | Comments |
|---|---|---|---|---|---|---|---|
| 1 | Denada Charm Morton Red Tip | *U. japonica X U. wilsoniana* | April 2005 | 4.3a | 22.8a | 16.5bcd | 1 blew over |
| 2 | Triumph Morton Glossy | *U. pumila X U. japonica X U. wilsoniana* | April 2005 | 3.4bc | 19.7bc | 16.6bcd | |
| 3 | Elmer II Allee | *U. parvifolia* | April 2005 | | | | Failed to establish |
| 4 | Homestead | *U. glabra X U. carpinifolia X U. pumila* | April 2005 | 3.4bc | 18.2cde | 13.0de | 2 dead |
| 5 | Patriot | *(U. glabra X U. carpinifolia X U. pumila) X U. wilsoniana* | April 2005 | 3.3bc | 21.8ab | 19.75ab | 1 dead |
| 6 | Emerald Sunshine | *U. propinqua* | April 2005 | 2.1fg | 15.2ef | 9.2fg | 1 dead |
| 7 | Commendation Morton Stalwart | *U. carpinifolia X U. pumila X U. wilsoniana* | April 2005 | 4.2a | 23.4a | 18.35bc | |
| 8 | Vanguard Morton Plainsman | *U. pumila X U. japonica* | April 2005 | 3.75ab | 19bc | 22.8a | |
| 9 | Frontier | *U. carpinifolia X U. parvifolia* | April 2005 | 2.5def | 15.7def | 7.6fg | |
| 10 | Pioneer | *U. glabra X U. carpinifolia* | April 2005 | 3.1bcd | 18.8bcd | 13.1ed | |
| 11 | New Horizon | *U. pumila X U. japonica* | April 2005 | 3.2bcd | 18.8bcd | 10.4ef | 2 dead |
| 12 | Accolade Morton | *U. japonica X U. wilsoniana* | April 2005 | 2.9cde | 19.3bc | 15.8cd | |
| 13 | Prospector | *U. wilsoniana* | April 2005 | 3.1cde | 15.7def | 15.3cd | |
| 14 | Valley Forge | *U. americana* | April 2005 | 2.3ef | 11.8g | 15.3cd | 1 broken leader, 1 staked |
| 15 | New Harmony | *U. americana* | May 2006 | 1.6g | 14.5fg | 6.1gh | |
| 16 | Princeton | *U. americana* | May 2006 | 2.2efg | 17.0cdef | 8.1fg | |
| 17 | Prairie Expedition | *U. americana* | May 2007 | 0.6h | 6.2h | 3.5h | |

*Values followed by same letters within column are not different ($P < 0.05$).