'Prospector' Elm

A.M. Townsend¹, L.R. Schreiber², W.O. Masters³, and S.E. Bentz⁴
 U.S. Department of Agriculture, Agricultural Research Service, U.S.
 National Arboretum, Washington, DC 20002

Additional index words. tree breeding, Dutch elm disease, insect resistance, disease resistance

Elms generally make excellent urban trees because they are able to withstand the multitude of environmental stresses associated with city conditions. Unfortunately, both Dutch elm disease, caused by *Ceratocystis ulmi* (Buism.) C. Moreau, and the elm leaf beetle [*Xanthogaleruca luteola* (Muller)] restrict the extensive use of unimproved elms. 'Prospector' elm (*Ulmus wilsoniana* Schneid.) was released because of its insect and disease resistance, vase-shaped crown, intermediate size, and widespread adaptability. -

Origin

'Prospector' elm (NA 55398, PI 536050) is a seedling selection of *Ulmus wilsoniana* grown from a seedlot of unknown origin. Two-year-old seedlings were planted about 1965 in Delaware, Ohio, and in 1980, one tree ('Prospector') was selected for more intensive evaluation. It was propagated by softwood cuttings and, along with ramets from several other clones, was established in 1982 in nursery beds in a randomized block, split-

plot design. Eighteen trees per clone in each of three blocks constituted the whole plots in the design. Within each whole plot, there were three subplots representing three inoculation dates, 29 May, 28 June, or 24 July 1984. Each subplot consisted of six trees; across all three blocks, therefore, 18 trees per clone were inoculated on each date. Inoculations were made to create an artificially high spore concentration inside the tree and to test for the stability of disease resistance at different stages of plant growth and development. These inoculations were made in the main trunks 14 cm above ground level with a mixed suspension (1.4×10^6 spores/ml) of aggressive and nonaggressive isolates of *C. ulmi*. Comparison of disease symptom expression 4 weeks after inoculation showed

'Prospector' to have greater resistance than Standard Resistant Clone No. 1 (Table 1). The latter clone has proved to be resistant to both aggressive and nonaggressive strains of the fungus in previous studies (unpublished). 'Prospector' also has been found to be resistant to the elm leaf beetle (Hall and Townsend, 1987).

Elm yellows is an often lethal elm disease probably caused by mycoplasma-like organisms. Elm species of European or Asiatic origin are tolerant or immune to this disease (Sinclair et al., 1987). Based on its Asiatic origin and on its apparent field resistance when grown among infected American elms (*U. americana* L.) at Delaware, Ohio, 'Prospector' can be expected to express tolerance to natural infections of elm yellows.

Description

'Prospector' elm has a vase-shaped crown similar to that of American elm (Fig. 1) but becoming pendulous at a much lower height. One-year-old rooted cuttings planted at Delaware, Ohio, in April 1980, showed an average height and crown spread of 7.0 m and 6.4 m, respectively, in Sept. 1989. Branch angles average 53°, and range from 28° to

Table 1. Relative susceptibility of several elm clones to *Ceratocystis ulmi*.

Clone	Avg. percent of crown affected by symptoms 4 weeks after inoculation ^a			Avg. percent dieback of crown 1 year after inoculation		
	Inoculation dates (1984)					
	29 May	28 June	24 July	29 May	28 June	24 July
Standard Resistant Clone No. 1 ^b	22 ± 4	1 ± 1	0	34 ± 6	1 ± 1	0
'Prospector'	0	0	0	0	0	0
'Homestead'	0	0	0	0	0	0

^aMixed spore suspension of *Ceratocystis ulmi* from these sources was used: Massachusetts, North Dakota, Ohio, and Wisconsin. Inoculations were made in the base of different 3-year-old ramets on each date.

^b*U. glabra* × (*U. wallichiana* × *U. carpinifolia*).

Received for publication 8 Feb. 1990. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked advertisement solely to indicate this fact.

¹Research Geneticist.

²Research Plant Pathologist.

³Agricultural Research Technician.

⁴Horticulturist.

Fig. 1. 'The 'Prospector' elm.

63°. The canopy is dense with large [average 114×83 mm (length/width)] oblong-obovate leaves. Newly expanding leaves are an orange-red (35A) (Royal Horticultural Society, 1966), but gradually darken to a yellow-green (144A) and finally to a green (137B). The underside of mature leaves is a

yellow-green (147B). Leaf color in the autumn is a yellow (13A). Branches, bark, buds, and fruits are typical for the species.

Adaptability trials in the northern United States have shown 'Prospector' to be cold hardy, with no injury after 3 years in St. Paul, Minn. It has also been successfully

grown in Maryland, California, Illinois, Ohio, Oklahoma, Oregon, Tennessee, and Virginia without heat, drought, or cold injury. It can be considered to be adaptable in U.S. Dept. of Agriculture zones 4 through 7 (U.S. Dept. Agr., 1990).

'Prospector' elm should make an excellent street, lawn, highway, or park tree. Its small to intermediate size will be particularly useful for planting under power lines. Its unique combination of insect and disease resistance and vase-shaped crown should make it a popular landscape cultivar.

'Prospector' is easily propagated from softwood cuttings taken in the spring or early summer, dipped in 0.8% IBA, and placed under intermittent mist in a mixture of 1 peat : 1 perlite (v/v) or other similar medium. Rooting generally occurs within 4 weeks.

Availability

The U.S. Dept. of Agriculture released this cultivar in 1990. Several wholesale nurserymen are propagating and growing liners of this new cultivar for future sale. Plants are not available from the U.S. National Arboretum at this time.

Literature Cited

- Hall, R.W. and A.M. Townsend. 1987. Suitability of *Ulmus wilsoniana*, the 'Urban' elm, and their hybrids for the elm leaf beetle, *Xanthogaleruca luteola* (Muller) (Coleoptera: Chrysomelidae). *Env. Entomol.* 16:1042-1044.
- Royal Horticultural Society. 1966. RHS colour chart. London.
- Sinclair, W. A., H.H. Lyon, and W.T. Johnson. 1987. Diseases of trees and shrubs. Comstock, Cornell Univ. Press, Ithaca, N.Y.
- U.S. Dept. of Agriculture. 1990. Plant hardiness zone map. U.S. Dept. Agr. Misc. Publ. 1475.