New Propagation Material to Substitute for the European (Wych) Elm

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INTRODUCTION

Ulmus glabra, European (wych) elm, has a range of qualities which make it a very valuable tree species in Denmark. First and foremost it is one of the most wind resistant tree species that we have. Furthermore it is easy to establish, robust, and responds well to pruning (Madsen, 1997). When Duch elm disease (DED) in the late 1970s became a reality in Denmark and damage began to show up as numerous dead trees in parks and urban areas a need for alternative trees arose either in the form of new tolerant *Ulmus* species, their hybrids, or in the form of trees from other genera.

BREEDING EFFORTS WITH ELM

True hybridisation and selection work has been carried out in the Netherlands and U.S.A. The species involved were primarily from Asia where DED is thought to have been present for ages and where selections for DED tolerance have been made in domestic *Ulmus* species. As the relation between the host and the pathogen is a dynamic one researchers are reluctant to talk about resistant or immune trees because one never knows how long this situation will last.

At the former Institute for Landscape Plants in Hornum, North Jutland a number of selected Dutch clones were imported for testing their climatic adaptation and aboricultural value. From these trials the cultivars 'Lobel' and 'Plantjin' were recommended. The problem is to find DED tolerant *Ulmus* clones with the same aboricultural value as *U. glabra*. 'Lobel' came out of the tests with high scores due to its hardiness and healthiness. The growth habit is slender with a central leader. *Ulmus* 'Plantjin' has a growth habit similar to 'Lobel', but is slightly less winter hardy. The twigs of this cultivar have a slight red/purple blush and the leaves are less rough giving it an attractive appearance (Brander and Bøvre, 1987). Both of these cultivars are included in the Danish elite plant system, Dafo, and are distributed through the Danish Elite Plant Station in Lunderskov.

In addition numerous of American *Ulmus* selections have been imported to the Department of Ornamentals in Arslev where they are being tested together with *U. japonica* seedlings that were imported by Poul Erik Brander on several occasions. In spite of the harsh winter climate in the eastern U.S.A. where the clones were selected, several of them lack winter hardiness in the mild maritime winters of Denmark. This fact probably highlights the importance of summer heat unit accumulation for the development of sufficient winter hardiness. Several of the American clones have shown signs of lack of phenological timing with the Danish climate. A few clones have started bud burst and blooming in October shortly after leaf senescence. In comparison with this several of the *U. japonica* seedlings have done well and have been propagated by cuttings. Several of these have a growth habit that resembles that of *U. glabra* but are slightly smaller trees (Brander and Johansen, 1997). While efforts around the world have concentrated on hybridisation followed by clonal selection, the

Department of Ornamentals at the moment is surveying the possibilities for development of a defined seed source of *U. japonica* with relatively uniform offspring and a sufficient degree of resistance againsts DED. Such a program would meet the wish for genetic diversity in the reforestation material in combination with low costs of establishment. A potential side effect from this program could be that the Japanese elms through hybridisation could introduce resistance genes in the domestic population of *U. glabra* and thus enhance the natural process in which a species genetically adapts itself to the pressure from a serious disease. Such a process may otherwise take hundreds and maybe even thousands of years.

USE OF OTHER GENERA

Brander (1980) screened a number of broad-leaved tree species and clones for their suitability as substitutes for elms. The conclusion was that several of our broad-leaved tree species, after some selection work, could act as substitutes for elm although none of them on an overall basis compared well with *U. glabra* in the windy areas of Western Jutland. As part of this program numerous Danish linden clones have been tested for their suitability as alley trees and/or as substitutes for elm. From his work three new cultivars have been released that should be available in the nurseries shortly (Brander, 1995). Two of the cultivars are thought to be potential substitutes for elm and are briefly described here.

***Tilia platyphyllos* 'Fenris'.** A clone of the European large leafed linden that was originally found at the Arboretum at Hørsholm in North Zealand. The cultivar is characterised by its strong and stiff growth habit. It has compared well in trials and is less susceptible to aphids than the species itself.

***Tilia* 'Odin'.** This clone was found in a 40-year-old urban planting in Zealand thought to consist only of *T. platyphyllos*. However, a single look is enough to distinguish 'Odin' from this species. The leaves are larger and the growth more vigorous just as a number of less visible features are different. In that respect the clone has more resemblance with the American linden, *T. americana*, that has been planted to a certain extent south of our borders. A qualified guess is that 'Odin' is a hybrid between *T. platyphyllos* and *T. americana*, the so called *T.* ×*flaccida* (Woldemar, 1998). This could also explain the extreme vigour that is also known from interspecific hybrids in other genera, e.g., *Populus* and *Salix*. Overall, 'Odin' is a tree that gets attention wherever it is displayed as it differs significantly from any other tree normally seen in the country. However, only time will show whether this tree also has a future in the windy parts of Western Jutland.

LITERATURE

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