



Disease-resistant elms
Butterfly Conservation trials report 2019

Andrew Brookes



**Butterfly
Conservation**

Saving butterflies, moths and their habitats

Disease-resistant elms, *Butterfly Conservation* trials report, 2019

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1. Abstract

The Hampshire & Isle of Wight Branch of *Butterfly Conservation* (BC) initiated trials of elm cultivars and species resistant to Dutch Elm Disease (DED) in 2000, in fulfilment of Objective 5 for the White-letter Hairstreak (WLH) in BC's *South Central Regional Action Plan*: to evaluate their potential as host plants for the butterfly, now on the IUCN Red List as 'in imminent danger of extinction'. This report, originally published in 2010, has been sub-stantially revised in the light of the 'Princeton' fiasco. 'Princeton', an American Elm cultivar, was widely promoted in the UK without having been tested for resistance by the European method of inoculation. This method is far more invasive, to reflect the much greater vector efficacy of the larger elm bark beetle, *Scolytus scolytus*, not found in the US. The loss of many 'Princeton' elms to DED obliged the relegation of other American cultivars until proven here.

In 2015, the White-letter Hairstreak was found breeding on the DED-resistant cultivars LUTECE and 'Sapporo Autumn Gold'. The discovery of the WLH on LUTECE is particularly significant as the tree has a very different periodicity from the reputedly favourite native host, wych elm, suggesting the insect is possessed of a considerable adaptability which could see it breeding on all the high-resistance cultivars featured in this report.

2. Introduction

The elm trials are located at four sites in southern Hampshire. The sites feature very diverse ground conditions, from arid rendzinas atop an outlier of the South Downs to waterlogged London Clays below 1m A S L along the shores of Portsmouth Harbour. This report focusses on nine cultivars available in Europe with a scientifically proven '5 out of 5' resistance to DED, and the anomalous species *Ulmus laevis* which, whilst devoid of any innate resistance, is rarely infected owing to a triterpene in its bark rendering it unpalatable to the vector *Scolytus* bark beetles. The high DED-resistance of the cultivars featured in this report has been determined in Europe by the Institut Nationale pour la Recherche Agronomique (INRA) in France, the Istituto per la Protezione delle Piante (IPP) in Italy, the Universidad Politecnica Madrid, and Eisele GmbH in Germany. Testing in all instances was by inoculation with unnaturally high doses (inoculum: 10^6 spores / ml) of the DED pathogen *O. novo-ulmi* subsp. *americana*.

The BC trials have therefore focussed on the growth and appearance of the trees, together with their tolerance of environmental stresses such as exposure, drought, and waterlogging.

3a. List of highly DED-resistant trees included in the trials

CULTIVAR	ORIGIN
'Ademuz'	Universidad Politecnica Madrid, Spain
'Columella'	Dorschkamp, Wageningen, Netherlands
'Morfeo'	IPP, Florence, Italy
'Nanguen' = LUTÈCE *	Dorschkamp, Wageningen, Netherlands
'New Horizon'	WARF, Wisconsin, USA
'Plinio'	IPP, Florence, Italy
'San Zanobi'	IPP, Florence, Italy
'Sapporo Autumn Gold'	WARF, Wisconsin, USA
'Wanoux' = VADA	Dorschkamp, Wageningen, Netherlands
SPECIES	ORIGIN
<i>Ulmus laevis</i>	Various locations in Europe

3.b Other elms included in the trials

Below is a list of other cultivars and species planted. These are not described here on account of their resistance to DED or other diseases in Europe being found to be either sub-standard or, as with most of the American cultivars, simply unknown.

CULTIVAR	ORIGIN
'Arno'	IPP, Florence, Italy
'Fiorente'	IPP, Florence, Italy
'Lewis & Clark' = PRAIRIE EXPEDITION	North Dakota State University, USA
'Morfeo'	IPP, Florence, Italy
'Morton' = ACCOLADE	Morton Arboretum, Illinois, USA
'Morton Glossy' = TRIUMPH	Morton Arboretum, Illinois, USA
'Morton Stalwart' = COMMENDATION	Morton Arboretum, Illinois, USA
'Patriot'	USDA National Arboretum, USA
'Princeton'	Princeton Nursery, Princeton, Mass. USA
'Prospector'	USDA National Arboretum, USA
'Valley Forge'	USDA National Arboretum, USA
SPECIES	ORIGIN
<i>Ulmus davidiana</i>	Liaoning Province, China
<i>Ulmus davidiana</i> var. <i>japonica</i>	Sapporo, Japan
<i>Ulmus gaussonii</i>	Anhui Province, China
<i>Ulmus glabra</i>	Mount Šimonka, Slovakia
	Bergemolo, Piedmont, Italy
<i>Ulmus laciniata</i>	Sapporo, Japan
<i>Ulmus microcarpa</i>	Chayu region, Tibet
<i>Ulmus pumila</i>	Utah, USA

* Names in capitals are the selling names used in commerce, as opposed to the registered cultivar names which are always written lower case within single inverted commas. Unlike registered cultivar names, selling names may vary from country to country.



Figure 2. LUTECE elm, Newport, IoW, hosting the WLH in 2015 Photo: Caroline Dudley

4. Performance

Most of the elms are hybrid cultivars, with Asiatic ancestors *U. wallichiana* or *U. pumila*, from whom they have inherited their anti-fungal genes. However, environmental conditions in the Far East are, with few exceptions, very different from those experienced in southern England. A critical aspect of the trials was therefore the assessment of the trees' adaptation to a temperate maritime climate. Many of the cultivars also differ in appearance from the European species, often being significantly smaller with uncharacteristic foliage. Ergo: some would not, for all their virtues, look at home in the wider English countryside, and better retained as ornamentals in the grew very slowly and / or exhibited poor structure.

5. Availability in the UK

On 1 January 2018 strict import controls were introduced by DEFRA to reduce the risk of the accidental import of alien phytophtherae unknown in the UK, in particular Elm Yellows (phloem necrosis). Accordingly, all consignments of elms from the EU must now carry phyto passports declaring their area of origin free of elm diseases. Unhappily, this has meant the termination of all imports of the worthy elm cultivars raised by IPP Italy, owing to the pre-valence of Elm Yellows across much of the country. However, these same trees are still reviewed in this report as there is no restriction on their propagation in the UK from specimens already established here, cuttings of which may be sourced via the author, provided they are not used for commercial purposes. Negotiations are in hand (Feb. 2019) with a micropropagation nursery in Shropshire to obtain licences to legitimately raise and sell several of the best cultivars in the UK.

6. The butterfly

The White-letter Hairstreak *Satyrion w-album* is a monophagic species entirely reliant on Elm. Larvae have been very occasionally found feeding on oak and bird cherry in continental Europe, but these occurrences are regarded as random. Moreover, it is *sexually mature* elm which is preferred as the larvae hatch in mid-March, a number of weeks before the leaves flush, and immediately feed on the elm flowers before progressing to the seeds. (Figure 2). However, recent research by Bink et al. in the Low Countries has discovered that larvae hatching on flowerless trees are able to survive by remaining dormant for up to six weeks, ie. until the leaves flush, provided climatic conditions allow them to rehydrate on hatching. This phenomenon could explain the occasional sightings of the butterfly on English elm suckers.

The White-letter Hairstreak is also endemic to much of the Far East, including Siberia and Japan, where it thrives on several of the elms used in hybridization or planted in their own right in Europe and the USA; the butterfly is not found in North America however.

The WLH has yet to colonize the elms in the BC trials' plantations owing to extinctions in their neighbourhoods soon after planting. However, the butterfly has been found breeding on the cultivar 'Nanguen' (selling name: LUTÈCE) planted on the Isle of Wight in 2003, 'New Horizon' at Vauxhall Pleasure Gardens, and on 'Sapporo Autumn Gold' in Hertfordshire.

NB. The French natural history unit VarWild has produced a 14 minute film of the lifecycle of the WLH, with close-up photography: <https://www.youtube.com/watch?v=vdDNGF2HDr0>



Figure 3. White-letter Hairstreak larva on elm flower.

Photo: Peter Eeles

7. The future

The propagation by the Escuela de Montes, Universidad Politecnica Madrid, of native Field Elms *Ulmus minor* with a very high resistance to Dutch elm disease must represent the most significant development in the 90-year history of European elm breeding. The trees are currently undergoing assessment at other stations around Spain. However, DNA analysis has found that several at least hold genes of *Ulmus pumila* which may jeopardize their use as forestry material. That apart, their ability to sucker readily from roots should make them excellent candidates for hedgerow and thicket planting.

Long-overdue restrictions on elm imports from the EU, introduced by DEFRA on 1 January 2018, have significantly reduced the range of cultivars imported into the UK. In response, attempts are being made to persuade British nurseries to obtain Plant Breeders' Rights to raise and sell the trees in the UK. However, as the potential market is essentially founded on conservation, sales are not expected to be high, and consequently making a financial commitment (@4000 Euros down-payment in 2019) against such an uncertain future is not to be taken lightly.

The recent discovery of the Elm Yellows phytoplasma *Candidatus phytoplasma ulmi* throughout France remains a cause for concern, as many hybrid cultivars with exotic species such as *U. wallichiana* in their ancestries have been found to be especially susceptible, the disease, unknown beyond Europe and North America.

Some forms of Field Elm *U. minor* are also very susceptible to Elm Yellows. At least one European elm authority considers it likely the disease already exists in the UK, its presence masked by the resemblance of its overt symptoms to those of DED. As a precaution against the disease, and against mutations of DED, the planting of a range of cultivars in any one location is strongly recommended.

The importation of all trees from Europe may well be subjected to two years' quarantine, in recognition of the threat from alien phytophtherae, 17 of which have been accidentally introduced to the UK in the past 30 years. Ergo, the propagation of home-grown disease-resistant elms is to be strongly encouraged.



Figure 4. Elm yellows Photo: E. Collin

8. The trees described

The following pages offer illustrated descriptions of the better performing, most disease-resistant cultivars raised on both sides of the Atlantic, and the species *Ulmus laevis*. A performance checklist is offered on each page:

+++ = Good, ++ = Average, + = Poor.

'Ademuz'

Ulmus minor cultivar from Spain

Origin: Universidad Politecnica Madrid, release 20??



Universidad Politecnica Madrid

DESCRIPTION

'Ademuz' is one of a number of highly DED-resistant Field Elm *Ulmus minor* clones under assessment by the Escuela de Montes, Universidad Politecnica Madrid, as potential forestry trees. The branches are largely devoid of corky tissue, the leaves, on 5 mm petioles, are ovate, typically oblique at the base and acuminate at the apex, the average length and width 5.5 × 3.5 cm, the margins doubly serrate. The tree, cloned from an unidentified specimen near the eponymous town north-west of Valencia, develops a balanced, open structure, and was considered the most attractive of the 'Madrid 7', scoring 4.5 out of 5. Foliar density relative to 'Sapporo Autumn Gold' is described as 'medium'. 'Ademuz' suckers from roots to form clumps. Scheduled release to commerce has been postponed owing to the discovery of *U. pumila* genes in other Madrid clones.

PERFORMANCE

- +++ Stability (resistance to wind rock)
- +++ Resistance to exposure (leaf scorch, branch breakage)
- +++ Resemblance to native elm
 - ++ Suitability for street planting
- +++ Rate of growth
 - ++ Tolerance of waterlogging
- +++ Tolerance of drought

Wikipedia: http://en.wikipedia.org/wiki/Ulmus_%27Ademuz%27

ResistantElms: <http://www.resistantelms.co.uk/ulmus-minor-ademuz/>

'Columella'

Hybrid cultivar: 'Plantyn' self- or openly-pollinated

Origin: Dorschkamp, Netherlands; released 1987.



DESCRIPTION

'Columella' has a most distinctive fastigiata, monopodial structure, although the crown eventually broadens with age. The peculiarly twisted leaves are in asymmetric clusters on short branchlets, often encircling them and remaining thus well into winter, a trait inherited from its Exeter Elm ancestor. 'Columella' readily defoliates in drought, a trait inherited from its Himalayan elm ancestor. Trees in the Netherlands > 25 years old are now collapsing because of graft incompatibility with their wych elm rootstocks. However, all trees post-2012 have been propagated by rooting cuttings. Trees planted near the sea in Portsmouth, in 2003 all died, probably because of salt intolerance. Where planted as urban street trees, the cultivar appears to have been very successful in the UK.

PERFORMANCE

- +++ Stability (resistance to wind rock)
- +++ Resistance to exposure (leaf scorch, branch breakage)
 - + Resemblance to native elm
- +++ Suitability for street planting
- +++ Rate of growth (height increase: 67 cm, d.b.h. increase: 0.9 cm p. a.)
 - ? Tolerance of waterlogging
 - ++ Tolerance of drought

Wikipedia: http://en.wikipedia.org/wiki/Ulmus_%27Columella%27

ResistantElms: <http://www.resistantelms.co.uk/elms/ulmus-columella/>

'Morfeo'

Hybrid cultivar: 'Plantyn' × *U. pumila*

Origin: Istituto per la Protezione delle Piante, Italy; released 2011



DESCRIPTION

'Morfeo' is a robust, fast-growing tree able to freestand at a very early age. The stem commences forking at between 1.5 and 2 m from the ground, the branches on juvenile trees with irregular patches of corky bark. The reddish branchlets bear mid-green [elliptic](#) leaves, < 120 mm (avg. 88 mm) long × < 80 mm (avg. 56 mm) broad with 10 mm petioles. The leaves closely resemble those of the [Field Elm](#), with typically asymmetric base and acuminate apex; they turn [crimson](#) in late October, before falling in early November. The [sessile samarae](#) ripen in mid May, and are narrowly obovate, 17–22 mm long × 9–13 mm broad with the seed offset next to the notched apex. In the UK the tree begins flowering in its fourth year, the [perfect](#), [apetalous](#) wind-pollinated flowers appearing in mid-March. Reputed to sucker from roots, it has yet to do so in the BC trials.

PERFORMANCE

- +++ Stability (resistance to wind rock)
- +++ Resistance to exposure (leaf scorch, branch breakage)
- ++ Resemblance to native elm
- ++ Suitability for street planting
- +++ Rate of growth (height increase: 70 cm, d.b.h. increase: 1.5 cm p. a.)
- ++ Tolerance of waterlogging
- +++ Tolerance of drought

Wikipedia: http://en.wikipedia.org/wiki/Ulmus_%27Morfeo%27

ResistantElms: <http://www.resistantelms.co.uk/morfeo/>

'Nanguen' = LUTÈCE

Hybrid cultivar: ('Plantyn' × (*U. minor* × *U. minor*)) × ('Bea Schwarz' × 'Bea Schwarz' selfed)

Origin: Dorschkamp, Netherlands; released 2002 by INRA, France (patent holders).



DESCRIPTION

The stem of LUTÈCE typically forks at a height of 1 - 2 m, with < 5 branches steeply ascending to form an open crown. The leaves are <11 cm long × <10 cm wide, similar in shape to those of the Field Elm *U. minor*, but with a very rough upper surface and coarsely serrated margins. The leaves are very late to flush, rarely before mid-May, a trait inherited from its Himalayan Elm *U. wallichiana* ancestor. In adolescence, the tree requires prolonged staking before it is able to freestand at about age 6. A specimen planted 2003 at Newport, IoW, was found to host the WLH in 2015. However in France, some young LUTÈCE plants were reputedly afflicted by the Elm Yellows phytoplasma, a pathogen as yet unknown in the UK; the Himalayan elm ancestor is known to be particularly susceptible to the disease.

PERFORMANCE

- ++ Stability (resistance to wind rock)
- +++ Resistance to exposure (leaf scorch, branch breakage)
- +++ Resemblance to native elm
 - + Suitability for street planting
- +++ Rate of growth (height increase: 87 cm, d.b.h. increase: 1.9 cm p. a.)
- ++ Tolerance of waterlogging
- +++ Tolerance of drought

Wikipedia: http://en.wikipedia.org/wiki/Ulmus_%27Nanguen%27

ResistantElms: <http://www.resistantelms.co.uk/elms/ulmus-lutece/>

'New Horizon'

Hybrid cultivar: *Ulmus davidiana* var. *japonica* × *U. pumila*

Origin: Wisconsin Alumni Research Foundation (WARF); released 1995



DESCRIPTION

The tree initially has a compact, pyramidal form, with comparatively dense foliage comprising glabrous, dark-green, elliptical leaves < 12 cm long by 7 cm broad, occasionally without the asymmetric bases typical of the genus. Flowering, and consequent fruiting, is meagre, a trait inherited from its Japanese elm 'mother'. The tree increases in height only slowly, while its trunk thickens comparatively quickly. Like its Siberian Elm parent, the crown of 'New Horizon' can occasionally suffer <25 % natural twig dieback over winter, seriously disfiguring the tree. Moreover, 'NH' is the most sensitive of all the trees on test to ground conditions, growing poorly on all but free draining soil although none perished anywhere. Available only as >4 m standards from Hilliers, it was found colonized by the White-letter Hairstreak in London in 2017.

PERFORMANCE

- +++ Stability (resistance to wind rock)
- ++ Resistance to exposure (leaf scorch, branch breakage)
- + Resemblance to native elm
- +++ Suitability for street planting
- + Rate of growth (height increase: 13 cm, d.b.h. increase: 1.0 cm p. a.)
- ++ Tolerance of waterlogging
- +++ Tolerance of drought

Wikipedia: http://en.wikipedia.org/wiki/Ulmus_%27New_Horizon%27

ResistantElms: <http://www.resistantelms.co.uk/elms/the-best-of-the-rest/>

'Plinio'

Hybrid cultivar: 'Plantyn' × *U. pumila*

Origin: Istituto per la Protezione delle Piante, Italy; released 2004



DESCRIPTION

'Plinio' is a Jekyll and Hyde character, forming an ungainly, unsteady tree with sparse, splaying branches and an often inadequate root system where grown on fertile soils (photo, left), whereas on thin, arid rendzinas (chalk soils, photo right) more substantial roots are stimulated, whilst exposure encourages sturdier, denser, topgrowth. NB. The suckering growth in the photo is from a neighbouring field elm, *U. minor*. 'Plinio' has proven one of the most successful cultivars trialled at the site on Ports Down (a South Downs outlier, drift geology Brickearth). The leaves are < 6.5 cm long x < 3 cm broad, glabrous on both sides, but devoid of autumn colour. The tree is one of the most DED-resistant ever raised in the Italian elm breeding programme, but no longer available from Italy owing to prevalence of elm yellows there. Rarely planted in the UK.

PERFORMANCE

- ++(+) Stability (resistance to wind rock)
- +++ Resistance to exposure (leaf scorch, branch breakage)
- ++ Resemblance to native elm
 - + Suitability for street planting
- ++ Rate of growth (height increase: 60 cm, d.b.h. increase: 1.3 cm p. a.)
- ++ Tolerance of waterlogging (>3 months' inundation over winter)
- +++ Tolerance of drought

Wikipedia: http://en.wikipedia.org/wiki/Ulmus_%27Plinio%27

ResistantElms: <http://www.resistantelms.co.uk/plinio/>

'San Zanobi'

Hybrid cultivar: 'Plantyn' × *U. pumila*

Origin: Istituto per la Protezione delle Piante, Italy; released 2003



DESCRIPTION

'San Zanobi' is a moderately fastigiate tree, the branches gradually arching to become pendulous with age. Lack of stability resulting from asymmetric root development was initially a concern, but has been overcome by better propagation practice. Nevertheless, roots should be carefully inspected on delivery. The glabrous, bright green leaves are <15 cm long × <6 cm broad, however like its compatriot 'Plinio', the tree lacks striking autumn colours. 'San Zanobi' begins flowering in its sixth year in the UK. Widely planted as a street tree in Italy, notably in and around the Villa Medici in Rome. Relatively easily propagated by hardwood cuttings taken in late February. 'San Zanobi' is no longer available from Italy owing to prevalence of elm yellows there. Rarely planted in the UK beyond the BC trials sites, 100 were established on the Pan estate, IoW.

PERFORMANCE

- +++ Stability (resistance to wind rock)
- +++ Resistance to exposure (leaf scorch, branch breakage)
- ++ Resemblance to native elm
- +++ Suitability for street planting
- +++ Rate of growth (height increase: 103 cm, d.b.h. increase: 1.6 cm p. a.)
- ++ Tolerance of waterlogging
- +++ Tolerance of drought

Wikipedia: http://en.wikipedia.org/wiki/Ulmus_%27San_Zanobi%27

ResistantElms: <http://www.resistantelms.co.uk/elms/the-best-of-the-rest/>

'Sapporo Autumn Gold'

Hybrid cultivar: *Ulmus davidiana* var. *japonica* × *U. pumila*

Origin: Wisconsin Alumni Research Foundation (WARF); released 1975



DESCRIPTION

'Sapporo Autumn Gold' forms a rounded, open crown similar to that of the Field Elm *U. minor*. The leaves are narrowly-elliptical, < 9 cm x < 4.5 cm wide; as the name implies, the leaves turn pale yellow in autumn. Flowering usually begins when the tree is aged six years. Although the oldest cultivar on trial, it remains one of the most resistant to DED, exhibiting just 2.8% defoliation and 1.2% dieback after inoculation in Italian trials, and has become the yardstick by which new cultivars are judged. The tree is known to host the White-letter Hairstreak in the wild in the UK. However, mature specimens planted at Christchurch in 1985 were damaged by Dryad's Saddle fungus, while others have suffered branch breakage at exposed sites. The cultivar is the cheapest and most readily obtained in the UK, as bare-root whips from French nurseries.

PERFORMANCE

- ++ Stability (resistance to wind rock)
- + Resistance to exposure (leaf scorch, branch breakage)
- +++ Resemblance to native elm
- ++ Suitability for street planting
- ++ Rate of growth (height increase: 53 cm, d.b.h. increase: 0.7 cm p. a.)
- + Tolerance of waterlogging
- +++ Tolerance of drought

Wikipedia: http://en.wikipedia.org/wiki/Ulmus_%27Sapporo_Autumn_Gold%27

ResistantElms: <http://www.resistantelms.co.uk/sapporo-autumn-gold/>

'Wanoux' = VADA

Hybrid cultivar: 'Plantyn' × 'Plantyn' selfed

Origin: Dorschkamp, Netherlands; released 2006 by INRA, France (patent holders).



DESCRIPTION

Last of the Dutch clones (No. 762) to be patented and released. Reported in press as being faster growing than LUTÈCE (in the French trials, VADA achieved 14 m at 20 years of age), this has been contrary to experience in Hampshire. Primarily intended for street planting, VADA is a fairly fastigate tree showing pronounced apical dominance, but it is not yet clear whether it is truly monopodial or merely upright. The stem tends to weave, but the rootstock seems impressively wind-firm. VADA leaves relatively late, in May, though not quite as late LUTÈCE. Leaves on vigorous shoots are large, glossy, and ultimately very dark. Towards the end of summer however, the foliage deteriorates, the lower leaves fall, bestowing a rather shabby appearance, though often remains free of blackspot. Available as bare-root saplings from France.

PERFORMANCE

- +++ Stability (resistance to wind rock)
- +++ Resistance to exposure (leaf scorch, branch breakage)
 - + Resemblance to native elm
- +++ Suitability for street planting
 - ++ Rate of growth (height increase: 53 cm, d.b.h. increase: 0.9 cm p. a.)
 - ++ Tolerance of waterlogging
- +++ Tolerance of drought

Wikipedia: http://en.wikipedia.org/wiki/Ulmus_%27Wanoux%27

ResistantElms: <http://www.resistantelms.co.uk/elms/ulmus-vada/>

***Ulmus laevis* – European White Elm**

Species, grown from seed

Origin: Loire Valley, France.



DESCRIPTION

Ulmus laevis is an anomaly, a fast-growing species with little or no resistance to DED, but which nevertheless usually survives to great age by dint of Alnulin, a triterpene in the bark which deters *Scolytus* sp. from feeding on, and thus infecting, it. A unique, vast, surface root system enables it to survive anoxic ground conditions during prolonged (>100-day) winter floods. It has little value as timber or firewood, but makes an important amenity tree and host of the White-letter Hairstreak. The tree is most easily identified in spring by flowers and later seeds on 25-30 mm-long stalks. In maturity, the roots form distinctive buttresses around the base of the trunk. Readily available from the continent. (NB Seed from EU often offered on Ebay is subject to the same DEFRA import regulation as plants). Occasionally offered by UK nurseries..

PERFORMANCE

- +++ Stability (resistance to wind rock)
- ++ Resistance to exposure (leaf scorch, branch breakage)
- +++ Resemblance to native elm
- +++ Suitability for street planting
- +++ Rate of growth (height increase: 80 cm, d.b.h. increase: 3.9 cm p. a.)
- +++ Tolerance of waterlogging (>3 months' inundation over winter)
- ++ Tolerance of drought

Wikipedia: https://en.wikipedia.org/wiki/Ulmus_laevis

ResistantElms: <http://www.resistantelms.co.uk/ulmus-laevis/>

9. Recommended trees

Countryside

Sheltered sites with moist, well drained soils:

'Morfeo'
'Nanguen' = LUTÈCE
'San Zanobi'
Ulmus minor 'Ademuz'
Ulmus laevis

Exposed downland with arid, chalk soils:

'Morfeo'
'Nanguen' = LUTÈCE
'Plinio'
'San Zanobi'
Ulmus minor 'Ademuz'

Sites with heavy soils, poorly drained, wet but not waterlogged:

'Nanguen' = LUTÈCE
Ulmus minor 'Ademuz'
Ulmus laevis

Waterlogged sites flooded for several months overwinter:

Ulmus laevis

Town

Parks & Gardens:

'New Horizon' (on free draining soils only)
'San Zanobi'
'Sapporo Autumn Gold'
Ulmus laevis

Streets:

'Columella'
'San Zanobi'
'Rebona' (on free draining soils only)
'New Horizon' (on free draining soils only)

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11. Disease-resistant elm cultivars & *Ulmus laevis*: Suppliers in or to the UK

There are currently **no** British nurseries with Plant Breeders' Rights enabling them to propagate DED-resistant elm cultivars for sale, consequently all trees sold are imported from Europe. Owing to historically poor demand, numbers available in the UK are usually low, except for standards supplied for street planting by Hillier Nurseries. Ergo, where large-scale planting is envisaged, importing direct from a continental wholesale nursery is often the only option.

While tree prices are generally on a par with those in the UK, carriage charges can substantially increase the final cost. Moreover, most European nurseries will insist on a minimum order value of €500.

As from 1 January 2018, all imports are required to have a phyt passport declaring their area of origin free of elm diseases, notably elm yellows. All imports of elm plants and seeds must be registered with DEFRA via the Edomero system.

'Ademuz'

Not in commerce until 2020. Rooted cuttings available from author.

'Columella'

Hillier Nurseries, Andlers Ash, Liss, Hants
Standards >4m high, rootballed
W: www.hilliertrees.co.uk
E: hosseinashadi@hillier.co.uk
T: 01794 368733

Boomkwekerij Gebr. Van den Berk B.V., Sint-Oedenrode, Netherlands
Standards, rootballed
W: www.vdberk.com
E: info@vdberk.co.uk
T: 00 31 413 480480

'Morfeo'

Can no longer be imported from Italy; could be propagated from cuttings taken from trees in UK.

'Nanguen' = LUTÈCE

Duchy of Cornwall Nursery, Lostwithiel, Cornwall
5-litre potted trees
W: www.duchyofcornwallnursery.co.uk
E: sales@duchyofcornwallnursery.co.uk
T: 01208 872668

Les Pépinières Minier, 49250 Beaufort-en-vallée, France
Small potted trees ("P9's") 30 cm high, and bare-root grafted ('Sapporo Autumn Gold' rootstocks) saplings
W: www.pepinieres-minier.fr
E: gbsales@minier-nurseries.fr
T: 00 33 2 41 79 48 43

11. Disease-Resistant Elm Cultivars & *Ulmus laevis*: Suppliers in or to the UK, cont.:

'New Horizon'

Hilliers Nurseries, Andlers Ash, Liss, Hants
Standards >4m high, rootballed
W: www.hilliertrees.co.uk
E: hosseinarshadi@hillier.co.uk
T: 01794 368733

'Plinio'

Can no longer be imported from Italy; could be propagated from cuttings taken from trees in UK.

'Rebona' (a more fastigate sibling of 'New Horizon' only recently included in BC trials)

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'San Zanobi'

Can no longer be imported from Italy; could be propagated from cuttings taken from trees in UK.

'Sapporo Autumn Gold'

Les Pépinières Minier, 49250 Beaufort-en-vallée, France
Bare-root whips, 1.5m tall (min. order value €500)
W: www.pepinieres-minier.fr
E: gbsales@minier-nurseries.fr
T: 00 33 2 41 79 48 43

Ulmus laevis

Landford Trees, Salisbury, UK
1.5-2.0m bare-root saplings **order before end of August**
W: <https://landfordtrees.co.uk/>
E: ed@landfordtrees.co.uk
T: 01794 390808

Noordplant, Glimmen, Netherlands
Bare-root whips @ 1.5m (from 2017) **order 1 year in advance**
W: www.noordplant.nl/
E: r.nijboer@noordplant.nl
T: 00 31 508 200192

Panglobal Plants, Frampton on Severn, Glos.
Small numbers of potted trees in various sizes
W: www.panglobalplants.com/plants-for-sale/shrubs/U/1/
E: info@panglobalplants.com
T: 01452 741641

Andrew Brookes, Butterfly Conservation, Hants & IoW Branch
ya.brookes2018@yandex.com