



Ulmaceae

Hemiptelea Planch.

Planera J.F.Gmel.

Ulmus L.

Zelkova Spach

VEGETATIVE KEY TO SPECIES IN EUROPEAN CULTIVATION

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Vegetative identification key.

Introduction:

This key is based on vegetative characteristics, and therefore also of use when fruits are absent.

- Use a 10x hand lens to evaluate leaf margin and pubescence in general.
- Look at the entire plant. Young specimens, shade and strong shoots give an atypical view.
- Beware of hybridisation, especially with plants raised from seed other than wild origin.

Taxa treated in this key: see [page 5](#).

Names referred to synonymy: see [page 5](#).

References:

- JDL herbarium
- living specimens, in various arboreta, botanic gardens and collections
- literature:

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Heybroek, H.M., Goudzwaard, L., Kaljee, H. - (2009) - Iep of Olm, Karakterboom van de Lage Landen, 272p.

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Rehder, A. - (1940) - **Ulmaceae** in Manual of cultivated trees and shrubs hardy in North America, p.174-187.

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<http://www.plantentuin.ugent.be>

<http://www.arboretumwespelaar.be/EN>

KEY TO GENERA

- 01 a Short shoots partly developed into thorns up to 10 cm long.
 genus *Hemiptelea* *H. davidii*
- b Short shoots never thorny. 02
- 02 a Lamina predominantly ovate **AND** LS secondary veins predominantly strongly forking
 before reaching margin (to the naked eye). genus *Planera* *P. aquatica*
- b Lamina elliptic to obovate or ovate to elliptic **AND** LS secondary veins not or partially
 strongly forking before reaching margin (to the naked eye). 03
- 03 a Lamina LS margin at mid-leaf predominantly without teeth between secondary veins (10×
 LENS). genus *Zelkova*
- b Lamina LS margin at mid-leaf with 0-1 or 1-several teeth between secondary veins and
 stronger forks (10× LENS). genus *Ulmus*: see page 3

genus *Zelkova*

- 01 a Lamina of well developed leaves on vegetative shoots with 9-15 teeth/side. 02
- b Lamina of well developed leaves on vegetative shoots with 3-8 teeth/side. 04
- 02 a Lamina apex subacute to acute. *Z. carpinifolia*
- b Lamina apex acute to acuminate or almost caudate. 03
- 03 a Petiole and lamina LS clearly pubescent at least on midvein and secondary veins (10×
 LENS). *Z. schneideriana*
- b Petiole and lamina LS predominantly glabrous, except vein axils (10× LENS). ... *Z. serrata*
- 04 a Petiole short: 2-4 mm. 05
- b Petiole long: 5-10 mm. 06
- 05 a Lamina margin predominantly with 3-4(-5) veins ending in teeth/side. *Z. abelicea*
- b Lamina margin predominantly with 4-6(-7) veins ending in teeth/side. *Z. sicula*
- 06 a Lamina margin serrate-dentate, teeth curved forward. *Z. sinica*
- b Lamina margin coarsely dentate, teeth triangular with apex +/- straight. . *Z. xverschaffeltii*

genus *Ulmus*

KEY TO GROUPS

Lamina secondary veins predominantly 11-16(-more)/side (exclude veins ending in apex, avoid strong growth). **Group 1**

Lamina secondary veins predominantly 6-12/side (exclude veins ending in apex, avoid strong growth). **Group 2: see page 4**

GROUP 1

Lamina secondary veins predominantly 11-16(-more)/side.

- 01 a Lamina apex acute. 02
b Lamina apex acute to acuminate or caudate. 03
- 02 a Lamina apex acute to (sub-)obtuse, LS margin at mid-leaf serrate to weakly biserrate = predominantly with 0-1 rather blunt tooth between secondary veins and stronger forks (10× LENS). ***U. parvifolia***
b Lamina apex acute, LS margin at mid-leaf clearly biserrate = predominantly with 2-3(-more) acute teeth between secondary veins and stronger forks (10× LENS). ***U. villosa***
- 03 a Lamina LS predominantly without large secondary vein forks. 04
b Lamina LS predominantly with several large secondary vein forks. 05
- 04 a Lamina US rough to the touch, LS longer side base with 1-2 extra secondary veins. ***U. americana***
b Lamina US rather soft to the touch, LS longer side base with 3-4 extra secondary veins. ***U. laevis***
- 05 a Petiole predominantly short: 2-4 mm **AND** base often clearly asymmetrical with longer side often overlapping/concealing petiole. 06
b Petiole predominantly (much) longer, **OR** base different. 07
- 06 a Lamina apical half often with 1-3 caudate lobes/side. ***U. laciniata***
b Lamina apical half predominantly without caudate lobes. ***U. glabra***
- 07 a Lamina US pubescent with long hairs (10× LENS). ***U. chenmoui***
b Lamina US glabrous (10× LENS). 08
- 08 a Petiole rather short 3-6 mm **AND** apex caudate. ***U. uyematsui***
b Petiole rather long: 6-12 mm, apex acute to acuminate. 09

- 09 a Lamina LS margin at mid-leaf predominantly with 2-3(-4) secondary teeth between secondary veins and stronger forks (10× LENS). 10
- b Lamina primary teeth at mid-leaf predominantly without or with 1-2 secondary teeth between secondary veins and stronger forks (10× LENS). 11
- 10 a Shoot rather thick, $\varnothing \geq 2$ mm. Lamina L/W $< 2/1$ *U. wallichiana*
- b Shoot rather thin, $\varnothing \leq 1,5$ mm. Lamina L/W $> 2/1$ *U. minor*
- 11 a Lamina midvein length 4-12 cm, ovate to obovate. *U. davidiana*
- b Lamina midvein length 8-15 cm, oblong ovate to oblong obovate. *U. castaneifolia*

GROUP 2
Lamina secondary veins predominantly 6-12/side.

- 01 a Lamina midvein length predominantly 3-8 cm, base slightly asymmetrical AND petiole ≤ 3 mm. 02
- b Lamina midvein length predominantly 8-18 cm, OR petiole 3-12 mm, OR lamina base clearly asymmetrical. 03
- 02 a Lamina apex predominantly rounded to obtuse, rarely acute. *U. crassifolia*
- b Lamina apex acute to slightly acuminate. *U. alata*
- 03 a Lamina midvein length often 10-18 cm AND petiole 2-4 mm AND base often clearly asymmetrical with longer side often overlapping/concealing petiole. 04
- b Lamina midvein length predominantly 4-10 cm, OR petiole 3-12 mm, OR lamina base different. 06
- 04 a Lamina apical half often with 1-3 caudate lobes/side. *U. laciniata*
- b Lamina apical half predominantly without caudate lobes. 05
- 05 a Lamina margin fimbriate (10× LENS!!!). *U. elliptica*
- b Lamina margin not fimbriate (10× LENS!!!). *U. glabra*
- 06 a Lamina LS margin at mid-leaf serrate to weakly biserrate = predominantly with 0-1 tooth between 2 secondary veins and stronger forks (10× LENS). 07
- b Lamina LS margin at mid-leaf clearly biserrate = predominantly with 1-2(-more) teeth between secondary veins and stronger forks (10× LENS). 10
- 07 a Lamina obovate to broadly obovate or orbicular. 08
- b Lamina ovate to elliptic or elliptic to obovate. 09
- 08 a Bark fissured. Lamina broadly obovate to orbicular. *U. macrocarpa*
- b Bark flaky. Lamina obovate. *U. lamellosa*
- 09 a Lamina apex acute to acuminate, LS large secondary vein forks 0-3/side. *U. pumila*
- b Lamina apex obtuse to acute, LS large secondary vein forks 3-5(-more)/side. *U. parvifolia*

- 10 a Lamina margin fimbriate (10× LENS!!!). 11
 b Lamina margin not fimbriate (10× LENS!!!). 12
- 11 a Lamina LS margin at mid-leaf with 1-2 teeth between 2 secondary veins and stronger forks (10× LENS). **U. canescens**
 b Lamina LS margin at mid-leaf with 2-3(-4) teeth between 2 secondary veins and stronger forks (10× LENS). **U. rubra**
- 12 a Present year shoot glabrous or glabrescent (10× LENS). **U. minor**
 b Present year shoot pubescent (10× LENS). 13
- 13 a Lamina ovate to suborbicular, apex acute. **U. minor**
 b Lamina ovate to obovate, apex acuminate. **U. davidiana**

Taxa treated in this identification key:

Hemiptelea davidii

Planera aquatica

Ulmus alata
Ulmus americana
Ulmus canescens
Ulmus castaneifolia
Ulmus chenmoui
Ulmus crassifolia
Ulmus davidiana
Ulmus elliptica
Ulmus glabra
Ulmus laciniata
Ulmus laevis
Ulmus lamellosa
Ulmus macrocarpa

Ulmus minor
Ulmus parvifolia
Ulmus pumila
Ulmus rubra
Ulmus uyematsui
Ulmus villosa
Ulmus wallichiana

Zelkova abelicea
Zelkova carpinifolia
Zelkova schneideriana
Zelkova serrata
Zelkova sicula
Zelkova sinica
Zelkova ×verschaffeltii (Z.carpinifolia × Z.serrata)

Names referred to synonymy:

Ulmus celtidea = *U. laevis*
Ulmus campestris = *U. minor*
Ulmus carpinifolia = *U. minor*
Ulmus densa = *U. minor*

Ulmus multinervis = *U. castaneifolia*
Ulmus plotii = *U. minor*
Ulmus procera = *U. minor*

