Betula L. (Betulaceae)

VEGETATIVE KEY TO SPECIES
CULTIVATED IN WESTERN EUROPE

Jan De Langhe

(10 September 2008 - 12 January 2012)
Vegetative key.

This key is based on vegetative characteristics visible during the longest period of the year.

List of taxa treated in this key: see page 7.

List of names referred to synonymy: see page 7.

To improve accuracy:

- Do examine only the two mature leaves at the base of long shoot and/or the leaves of short shoots unless otherwise mentioned. Depending the taxon, all other leaves can differ enormously in size and secondary vein number!!!
- Beware of hybridisation, especially with plants raised from seed gathered in collections.

Characteristics based on:

- JDL herbarium specimens
- living specimens, in various arboreta, botanic gardens and collections, especially these from wild origin
- literature:

Kurata. - (1964) - Betula in Illustrated Important Forest Trees Of Japan, VOL. 1, p. 68-74.
Lee, S. - (1963) - Betula in Forest Botany of China Supplement, p. 64-68.
Rehder A. - (1940) - Betula in Manual of cultivated trees and shrubs hardy in North America, p. 124-133.
Sargent, C.S. - (1915) - Betula in Plantae Wilsonianae VOL. 2, p. 455-488.

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http://www.plantentuin.ugent.be
1 a Shrub AND lamina with ≤6, secondary veins/side (rarely some laminas with up to 8 secondary veins/side), usually shallowly ribbed. .............................................................. 2

b Tree or shrub, IF shrub, then lamina with ≥8 secondary veins/side, often strongly ribbed. ..................................................................................................................................................... 7

2 a Margin crenate. Lamina obovate, +/- rounded or kidney shaped, at least as wide as long, often wider than long. ............................................................................................................................... B. nana (Betula/Apterocaryon)

b Margin not crenate, OR variably coarsely (serrate-) dentate to crenate. Lamina sometimes as wide as long but usually clearly longer than wide. ........................................... 3

3 a Apex acute AND margin acutely dentate. ........................................................................................................................................................................ 4

b Apex obtuse to rounded AND margin +/- obtusely dentate (beware: juvenile or strong shoots can differ in +/- acutely dentate margin and +/- acute apex). ......................... 5

4 a Young shoot with brownish glands (especially on top of shoot, visible with LENS), often sticky to the touch. ........................................................... B. occidentalis (Betula/Betulaceae)

b Young shoot densely hairy with short hairs AND poorly or not glandular, OR IF glandular then glands transparent or white (LENS). .................. B. pubescens (Betula/Betulaceae)

5 a Lamina broad, sometimes almost as wide as long AND margin coarsely dentate or +/- crenate and coarsely dentate. .............................................................. B. pumila (Betula/Apterocaryon)

b Lamina always clearly longer than wide. Margin more regularly and finely dentate. ... 6

6 a Lamina US dark green, ovate to rhombic. Primary teeth +/- broad at their base.
Hybrid between B. ermanii and B. ovalifolia, with intermediate characters: +/- deeply impressed secondary veins to 8/side, base cuneate, rounded to cordate, apex acute to obtuse. ....................... B. apicenix (Betula)

b Lamina US green, ovate to obovate. Primary teeth +/- narrow at their base.
........................................................................................................................................ B. fruticosa (Betula/Apterocaryon)

7 a Lamina at base remarkably cordate (>1 cm deep) AND primary teeth long excurrent (3-4 mm long) AND petiole 2-6 cm. ................................................ B. maximowicziana (Acuminatae/Acuminatae)

b Lamina at base rounded to cuneate or truncate AND primary teeth excurrent or not, OR IF lamina cordate then never >1 cm deep AND teeth never excurrent NOR petiole 2-6 cm long. .............................................................. 8

8 a Smell and/or taste of wintergreen oil obvious when damaging young shoot (this feature is even more perceptible after wetting damaged shoot). ......................... 9

b No smell nor taste of wintergreen oil. .................................................................................. 17

9 a Petiole and lamina LS on secondary veins +/- felty hairy with short hairs (decreasing in autumn), primary teeth excurrent. Fruiting catkin long and pendulous.
................................................................................................................................................ B. alnoides (Acuminatae/Acuminatae)

- Lamina ≤2 × longer than broad. Fruiting catkin solitary. ........................................ B. alnoides subsp. luminifera

- Lamina ≥2 × longer than broad. Fruiting catkin 2-5. ................................................. B. alnoides subsp. alnoides

b Petiole and lamina LS on secondary veins +/- silky to stiffly hairy with long hairs (decreasing in autumn), primary teeth not excurrent. Fruiting catkin short and erect. ........................................... 10
10 a Margin clearly coarsely to double-dentate: teeth +/- triangular, often ≥5 mm high and wide. Lamina LS +/- blue-green. ........................................... B. corylifolia (Nipponobetula/Nipponobetula)

b Margin different: teeth <5 mm high and wide. Lamina LS green. ........................................... 11

11 a Secondary veins ≤6/side. Apex obtuse. ........................................... B. lenta f. uber (Asperae/Lentae)

b Secondary veins ≥7/side. Apex acute to acuminate. ........................................... 12

12 a Multistemmed shrub/small tree. 1 year old long shoots mainly directed upwards, firm. ........................................... B. medwediewii (Asperae/Lentae)

b Tree. 1 year old long shoots variably directed, from +/- upwards to horizontal or pendent, thinner. ........................................... 13

13 a Lamina ovate to broadly ovate, midvein length up to 8 cm, secondary veins usually ≤10/side. Lamina base rounded to broadly cuneate. ................. B. globispica (Asperae/Lentae)

b Lamina ovate to oblong ovate, midvein length up to 12 cm (sometimes more), secondary veins usually 12-18/side. Lamina base +/- cordate to rounded, rarely +/- truncate to cuneate. ........................................... 14

14 a Bark at least partly peeling off with little up curled strips. B. alleghaniensis (Asperae/Lentae)

b Bark sombre, initially smooth or +/- granular, often vertically torn and bursting open in thick plates later. ........................................... 15

15 a Margin finely serrate, mainly 3-5(-9) teeth between 2 secondary veins. ........................................... B. lenta (Asperae/Lentae)

b Margin coarsely serrate, mostly 1-3(-4) teeth between 2 secondary veins. .......................... 16

16 a Lamina US between secondary veins clearly bullate. Fruiting catkin 2-4 x 1,5 cm, bract to 8 mm long, central lobe obvious longer than lateral lobes. B. grossa (Asperae/Costatae)

b Lamina US between secondary veins not so bullate. Fruiting catkin 2,5-6 x 1,2-2,5 cm, bract 8-13 mm long, central lobe 2 x longer than lateral lobes. B. insignis (Asperae/Lentae)

17 a Secondary veins mainly ≥10/side AND bark peeling in long thin papery strips or ribbons/strings (or at least so detachable by hand). ........................................... 18

b Secondary veins <10/side, at least so partly on the short shoots, OR bark different (+/- rough, or tearing loose with curly flakes, or stiff/breakable strips). ........................................... 24

18 a Lamina +/- triangular ovate, largest width clearly under the middle AND margin sharply (double-) serrate AND base truncate to weakly cordate. B. ermanii (Betula/Betulae)

b Lamina ovate to oblong ovate or elliptic. IF lamina +/- triangular ovate then margin not sharply (double-) serrate. ........................................... 19

19 a Bark with orange or pink-red to brownish colour. ........................................... 20

b Bark with whitish creamy to honey or grey colour. ........................................... 21

20 a Lamina LS glossy. Bark with brown colour. ......................... B. utilis var. utilis (Betula/Betulae)

b Lamina LS dull. Bark pink, coppery coloured to orange. ........................................... B. utilis var. albosinensis (Betula/Betulae)

- 3 -
21 a Lamina at base +/- cuneate AND largest width +/- in the middle of lamina. .......................................................... B. utilis var. jacquemontii hybrids (+ cultivars) (Betula/Betulae)

b Lamina at base +/- truncate to rounded or weakly cordate, largest width sometimes in, but usually below the middle of lamina. .......................................................... 22

22 a Lamina broad: ovate to broadly ovate. Margin with broad and coarse primary teeth and coarse incisions. .......................................................... B. utilis var. jacquemontii (Betula/Betulae)

b Lamina relatively narrow: ovate to oblong ovate. Margin with sharp primary teeth and fine acute incisions. .......................................................... 23

23 a Lamina ≥2 × longer than wide. Secondary veins mainly strictly rectilinear. .......................................................... B. costata (Betula/Costatae)

b Lamina ≤2 × longer than wide. Secondary veins slightly curved upwards. .......................................................... B. utilis var. utilis (Betula/Betulae)

24 a Young shoot with short pubescence. One year old shoot often short pubescent. .......................................................... B. pubescens (Betula/Betulae)

   Similar taxa with short and dense pubescence on shoot, glandular or not:
   - Shoot densely glandular whit whitish glands. Fruiting catkins pendulous, bract with central lobe not clearly enlarged. .......................................................... B. microphylla (Betula/Betulae)
   - Shoot not or sparsely glandular. Fruiting catkins +/- erect, bract prominent, with clearly enlarged central lobe. .......................................................... B. raddeana (Betula/Dahuricae)

b Young shoot and annual shoot glabrous, +/- glandular to warty, OR IF hairy then with long hairs, pointing towards apex of lamina. .......................................................... 25

25 a Young shoot +/- sticky and brownish glandular (especially visible near the top with a LENS). Lamina with ≤6 pair of secondary veins. .................... B. occidentalis (Betula/Betulae)

b Young shoot not as sticky and brownish glandular. Lamina mostly with ≥6 pair of secondary veins. .......................................................... 26

26 a Bark at least partly peeling in several layers of large scales and/or stiff plates. Large specimens exhibit this mainly on the branches while the trunk itself becomes very roughly ridged. .......................................................... 27

b Bark different: OR peeling with long papery thin strips, OR not peeling, OR roughly ridged. .......................................................... 28

27 a Pubescence of shoot, petiole, lamina LS woolly, +/- lasting, young shoot less obviously glandular. Lamina margin on short shoot double-serrate, 5-12 secondary veins/side. .......................................................... B. nigra (Betula/Dahuricae)

b Pubescence less obvious, thin to fading, and young shoot obviously glandular. Lamina margin on short shoot +/- irregularly serrate, 5-8(-9) secondary veins/side. .......................................................... B. dahurica (Betula/Dahuricae)

28 a Bark peeling in long papery thin ribbons/strings (or at least so detachable by hand). .......................................................... 29

b Bark not peeling, OR IF peeling then in little strips but no ribbons detachable by hand, AND with base of trunk very rough. .......................................................... 34
29 a Lamina US with secondary veins close together and clearly deeply impressed, **AND** lamina LS clearly ribbed, **AND** margin sharply (often double-) dentate.  
                          ..............................................................  **B. ermanii** (Betula/Costatae)

                     Hybrid between **B. ermanii** and **B. ovalifolia**, with intermediary characters: +/- deeply impressed secondary veins to b/side, base cuneate, rounded to cordate, apex sharp to obtuse.  
                     ......................................................................  **B. apoiensis** (Betula)

b Lamina US with secondary veins distant and impressed or not, **AND/OR** lamina LS +/- flat, with secondary veins not quite perceptible, **AND/OR** margin bluntly to +/- crenately dentate.  
                     ........................................................................................................  30

30 a Lamina US glossy, secondary veins often impressed and lamina between the secondary veins +/- bullate, sometimes bulged.  
                     ........................................................................................................  31

b Lamina US +/- dull, secondary veins not so impressed, lamina flat between the secondary veins, sometimes +/- wavy.  
                     ........................................................................................................  32

31 a Shoot and bud not or weakly glandular.  
                     ..............................................................  **B. utilis** var. jacquemontii (+ cultivars and hybrids) (Betula/Betulae)

b Shoot clearly glandular, bud +/- resinous.  
                     ..............................................................  **B. utilis** var. occidentalis (Betula/Betulae)

32 a Lamina variable: oblong ovate to ovate, or ovate to rhombic. Bark often heavily marked with striking lenticels (zebra-effect, especially on white specimens).  
                     ..............................................................  **B. papyrifera** (Betula/Betulae)

                     Similar species, lamina more gradually tapering into slender point, always with cordate base. Bark pink to red-brown (not white nor dark brown).  
                     ..........................................................................  **B. cordifolia** (Betula/Betulae)

b Lamina variable: triangular to broadly ovate, or broadly ovate to rhombic. Bark with less striking lenticels.  
                     ..............................................................................................  33

33 a Lamina US dark green with blue-green hue, LS contrasting paler grey- to blue-green and completely glabrous (margin ciliate!). Lamina base cuneate to truncate.  
                     ..............................................................  **B. pendula** subsp. szechuanica (Betula/Betulae)

b Lamina US dark green, LS paler green, glabrous to variably hairy. Lamina base cuneate to weakly cordate.  
                     ..............................................................  **B. pendula** subsp. platyphylla (Betula/Betulae)

34 a Lamina with ≤7 secondary veins/side. Bark white or partly white.  
                     ..............................................................  35

b Lamina with ≥8 pair secondary veins/side. Bark dark, often with contrasting pale lenticels.  
                     ..............................................................................................  36

35 a Apex acuminate to long acuminate, gradually tapering from the middle of the lamina. Bark white, +/- peeling, at base dark and coarsely ridged with dark rhombic parts.  
                     ..............................................................  **B. pendula** subsp. pendula (Betula/Betulae)

b Apex caudate. Lamina often remarkably abruptly narrowed almost from the middle towards the apex. Bark not peeling, white and speckled to orange brown.  
                     ..............................................................  **B. populifolia** (Betula/Betulae)

36 a Lamina with ≤12 secondary veins/side.  
                     ..............................................................  37

b Lamina with ≥12 secondary veins/side, **OR** at least in part of the leaves.  
                     ..............................................................  40

37 a Lamina midvein length on mature short shoot mostly <4 cm, LS +/- glaucous **AND** secondary veins clearly deeply impressed (lamina is strikingly ribbed).  
                     ..............................................................  **B. bomiensis** (Aspereae/Aspereae)

b Lamina midvein length on mature short shoot >4 cm, LS green, **AND/OR** secondary veins not impressed.  
                     ..............................................................  38
38  a Lamina midvein length average 6-9 cm, LS midvein and secondary veins with scattered tiny brown glands (aromatic at drying). .................... B. schmidtii (Asperae/Asperae)

b Lamina midvein length average ≤6 cm, LS not so glandular nor aromatic. ................. 39

39  a Lamina rhombic to ovate, base cuneate to rounded. Margin often with ≥2 teeth between two secondary veins. .................................................. B. chinensis (Asperae/Asperae)

b Lamina ovate to oblong ovate, base rounded. Margin with ≤2 teeth between two secondary veins.
.......................... B. fargesii (Asperae/Asperae)

40  a Shoot indumentum very densely honey coloured (later greyish and thinner), shoot colour is not visible. Lamina LS without glands. ....................... B. calcicola (Asperae/Asperae)

b Shoot less hairy, or with looser pubescence, shoot colour is visible. ....................... 41

41  a Lamina on short shoot with strong texture AND <2,5 cm width AND primary teeth clearly excurrent. .................................................... B. potaninii (Asperae/Asperae)

b Lamina on short shoot with thin texture, OR >3 cm width AND/OR primary teeth not excurrent or only slightly so on part of the leaves. ........................................ 42

42  a Lamina with >16 secondary veins/side, OR at least in part of the leaves, LS eglandular.
.......................................................... B. chichibuensis (Asperae/Asperae)

b Lamina with <16 secondary veins/side, LS +/- glandular. B. delavayi (Asperae/Asperae)
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