



Ghent University Botanical Garden

Viburnum L. (Adoxaceae)

VEGETATIVE KEY TO SPECIES IN CULTIVATION

Jan De Langhe

(28 August 2010 - 21 October 2012)

Vegetative key.

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

Taxa treated in this key: see page 14.

Taxa referred to synonymy in this key: see page 14.

Questionable/frequently misapplied names: see page 15.

To improve practice:

- Examine only mature leaves unless otherwise mentioned.
Depending the taxon, all other leaves can differ enormously in size and lateral vein number!!!
Also juvenile specimens can key out wrong.
- Beware of hybridisation, especially with plants raised from seed gathered in collections.

Background information:

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

Bean, W.J. - (1981) - Trees and Shrubs hardy in the British Isles vol.VI, p.685-721.
Dirr, M.A. - (2007) - *Viburnum* Flowering Shrubs for Every Season, 262 p.
Kenyon, L. - (2001) - *Viburnum*, 85 p.
Gardner, M.F. & Malécot, V. - (2000) - *Viburnum* in The European Garden Flora vol.VI, p. 418-429
Gleason, H.A. - (1963) - *Viburnum* in The New Britton And Brown Illustrated Flora of NE US & adj. Canada, p.290-295.
Hillier, J. & Coombes, A. - (2002) - *Viburnum* in The Hillier Manual of Trees & Shrubs, p.374-381.
Houtman, R.T. - (1998) - *Viburnum* in Dendroflora Nr 35, p.96-131.
Krüssmann, G. - (1978) - *Viburnum* in Handbuch der Laubgehölze III, p.450-470.
Li, H.-L. - (1963) - *Viburnum* in Woody Flora of Taiwan, p.891-898.
Malécot, V. & Qiner, Y. - (2011) - *Viburnum* in Flora of China, VOL.19, p.570-611.
Pojarkova, A.I. - (2000) - *Viburnum* in Flora USSR VOL. 23, p. 421-437.
Kurata. (1968) - *Viburnum* in Illustrated Important Forest Trees Of Japan, VOL.2, p.160-161.
Kurata. (1971) - *Viburnum* in Illustrated Important Forest Trees Of Japan, VOL.3, p.156-159.
Kurata. (1973) - *Viburnum* in Illustrated Important Forest Trees Of Japan, VOL.4, p.92-101.
Kurata. (1976) - *Viburnum* in Illustrated Important Forest Trees Of Japan, VOL.5, p.60-63.
Morton, C.V. - The Mexican and Central American species of *Viburnum* in Contributions from the United States National Herbarium VOL.26, part7, p.338-366.
Ohba, H. (2006) - *Viburnum* in Flora of Japan VOL.2, p. 420-428.
Ohwi. - (1965) - *Viburnum* in Flora of Japan, p.834-836.
Rehder A. - (1940) - *Viburnum* in Manual of cultivated trees and Shrubs hardy in North America, p.830-843.

Thanks to Anthony Aiello, Wolfgang Bopp, Peter Brownless, Mona Bourell, Koen Camelbeke, Laurent De Lepeleere, Paul Goetghebeur, François Hachette, Jean-Louis Hélaridot, Douglas Justice, Lloyd Kenyon, Tony Kirkham, Eric La Fontaine, Valéry Malécot, Jean Merret, Pamela Olshefski, Paul Reader, Bernd Schulz, and Frédéric Tournay for the constructive comments and help with collecting material. Also thanks to the responsible persons of various arboreta, botanic gardens and collections where I could collect herbarium specimens since 1982.

My explicit thanks for their support goes to Arboretum De Chèvreloup, Arboretum Wespelaar, Ghent University Botanical Garden, Morris Arboretum of the University of Pennsylvania, Royal Botanic Gardens Edinburgh, Royal Botanic Gardens Kew, University of British Columbia Botanical Garden at Vancouver and San Francisco Botanical Garden.

Last but not least much appreciation goes to Valéry Malécot from Agrocampus Ouest, centre d'Angers (Institut National d'Horticulture et de Paysage) for his support and numerous comments.

Copyright © 2010-2012 **Jan De Langhe**

Non-commercial use authorized with mentioning "Jan De Langhe - Ghent University Botanical Garden".

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

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

KEY TO GROUPS

- 01 a At least a part of the leaves with lamina 3(-5)-lobed (= with incisions $\geq 1/3$ horizontal distance margin-midvein). **GROUP A: see page 3**
- b Lamina not lobed, IF dentate then with incisions $< 1/3$ horizontal distance margin-midvein. 02
- 02 a At least a part of the leaves with lamina strongly 3-veined. **GROUP B: see page 4**
- b Lamina pinnateveined. 03
- 03 a Lamina LS covered with thick continuous layer of overlapping stellate hairs clearly visible to the naked eye (this character may be less obvious towards the end of the season and may also depend on growing conditions, therefore some taxa are also placed in other groups). **GROUP C: see page 5**
- b Lamina LS glabrous, OR IF pubescent then with thin scattered layer of stellate or single hairs (often only clearly visible with 10x LENS). 04
- 04 a Lamina base (at least in a part of the leaves) with circular glands (check several leaves on LS and US with 10x LENS). **GROUP D: see page 6**
- b Circular glands near lamina base always absent. 05
- 05 a Lamina margin entire to minutely dentate, several secondary veins arching and several forks anastomosing before the margin. **GROUP E: see page 8**
- b Lamina margin dentate, with secondary veins predominantly directly ending in teeth. **GROUP F: see page 11**

GROUP A: LAMINA LOBED

(at least a part of the leaves with incisions $\geq 1/3$ horizontal distance margin-midvein)

- 01 a Petiole exstipulate. 02
b Petiole stipulate, stipules strap-like or awn-like. 04
- 02 a Lamina LS base without circular glands on the surface (10× LENS). *V. edule*
b Lamina LS base with (0-)1-2 circular glands/side on the surface (10× LENS). 03
- 03 a Lamina apex obtuse to acute. *V. foetidum*
b Lamina apex acuminate to caudate. *V. kansuense*
- 04 a Petiole without glands at/near lamina base. Lobed leaves with lateral lobes serrate-dentate to coarsely dentate with >10 teeth/outer side (fruit at maturity black/purplish). . 05
b Petiole with glands near lamina base. Lobed leaves with lateral lobes coarsely dentate with <8 teeth/outer side (fruit at maturity red). 06
- 05 a Lamina LS minutely dotted. Current year shoot pubescent. *V. acerifolium*
b Lamina LS not minutely dotted. Current year shoot glabrous. *V. orientale*
- 06 a Lobes entire or varying from entire to dentate. Unlobed or (almost) entire laminas often present. *V. sargentii*
b Lobes dentate. Unlobed or entire laminas rare. *V. opulus*
- Lamina LS venation variably pubescent, usually with single +/- erect hairs (LENS).
 - Lamina terminal lobe width +/- = length. *V. opulus* var. *opulus*
 - Lamina terminal lobe length clearly > width. Scarcely different from European plants. *V. opulus* var. *americanum*
 - Lamina LS venation almost glabrous except vein axils (LENS). *V. opulus* var. *calvescens*

GROUP B:

At least a part of the leaves with LAMINA STRONGLY 3-VEINED

- 01 a Lamina LS near base often with flattish circular glands (10× LENS). 02
b Lamina LS base without circular glands. 04
- 02 a Lamina US lepidote, changing grayish or dusty waxy , especially if touched/crushed.
..... *V. cylindricum*
b Lamina US elepidote. 03
- 03 a Shoot at nodes often with several smaller leaves (midvein length ≤ 1 cm). Larger leaves
with lamina midvein length 3-10 cm. Lamina ovate, elliptic or obovate. *V. foetidum*
b Shoot at nodes without such smaller leaves: all leaves with lamina midvein length $< 2(-3)$
cm. Lamina elliptic to orbicular. *V. parvifolium*
- 04 a Lamina LS pubescent at least on venation. Lamina margin entire (new leaves, young
shoots) to coarsely dentate with teeth ≥ 2 mm. *V. ellipticum*
b Lamina LS glabrous or pubescence restricted to vein axils. Lamina margin remotely
finely dentate to entire. 05
- 05 a Only part of the leaves with lamina 3-veined, at least several laminas pinnateveined.
..... *V. ×globosum*
b All leaves with lamina 3-veined. 06
- 06 a Lamina basal veins ending near lamina middle. *V. propinquum*
b Lamina basal veins ending near lamina apex. 07
- 07 a Petiole US and midvein base purplish red. Broad compact shrub to 1,5 m high. . *V. davidii*
b Petiole US reddish and green, midvein base green. Larger dome-shaped shrub to small
tree. *V. cinnamomifolium*

GROUP C:

LAMINA LS COVERED WITH THICK CONTINUOUS LAYER OF
OVERLAPPING STELLATE HAIRS

- 01 a Lamina US tertiary veins not or slightly visible AND secondary veins 4-6/side. 02
b Lamina US tertiary veins at least half to all obvious, OR secondary veins >6/side (some laminae with 4 secondary veins/side may be present). 03
- 02 a Lamina LS white or almost so, petiole densely stellate pubescent. *V. utile*
b Lamina LS greyish white, petiole +/- stellate pubescent. *V. ×burkwoodii*
- 03 a Lamina margin entire or sometimes minutely denticulate with teeth usually +/- reduced to tips <1 mm. 04
b Lamina dentate (sometimes remotely in part of the leaves), with teeth >1 mm. 08
- 04 a Lamina midvein length <12 cm AND secondary veins 5-9/side. 05
b Lamina midvein length 10-20(-more) cm, OR secondary veins 8-13/side. 07
- 05 a Lamina L/W 2/1-4/1, margin entire. *V. 'Pragense'*
b Lamina L/W ≤2/1(-3/1), margin (minutely) dentate. 06
- 06 a Lamina margin minutely dentate. Petiole <8 mm. *V. 'Chesapeake'*
b Lamina margin dentate. Petiole 10-30 mm. *V. glomeratum*
- 07 a Plant evergreen. Lamina L/W >3/1, US very rugose, LS very reticulate. Margin entire or minutely denticulate (10-20(-30) × 5-10 cm, secondary veins 8-11/side). *V. rhytidophyllum*
b Plant semi-evergreen to deciduous. Lamina L/W <3/1, US +/- rugose, LS +/- reticulate. Margin minutely dentate (10-20 × 5-10 cm, secondary veins 8-13/side).
- Lamina apex acute, secondary veins 8-13/side. Hybrid with *V. buddleifolium*. *V. ×rhytidocarpum*
- Lamina apex obtuse to acute, secondary veins 8-10/side. Hybrid with *V. lantana*. *V. ×rhytidophylloides*
- 08 a Lamina L/W 2/1-3/1. 09
b Lamina L/W ≤2/1. 10
- 09 a Lamina US +/- glossy, tertiary veins clearly visible (examine mature leaves), secondary veins 8-13/side. *V. ×rhytidocarpum*
b Lamina US dull, tertiary veins not to poorly visible (examine mature leaves), secondary veins 8-10/side. *V. buddleifolium*
- 10 a Lamina margin at least in part of the leaves +/- superficially dentate, with teeth (almost) absent to short and broad AND petiole relatively short: 10-17 mm. *V. cotinifolium*
b Lamina margin always dentate with shallow to well developed coarse teeth. Petiole varying but at least in part of the leaves long: 10-40 mm. 11

- 11 a Lamina secondary veins varying from 8-12/side, margin dentate with >50 teeth/side.
 *V. lantana*
- Lamina $\leq 12 \times 9$ cm LS densely whitish-grey stellate pubescent. *V. lantana* var. *discolor*
 - Lamina $> 12 \times 9$ cm at least in part of the leaves, LS grayish stellate pubescent. *V. lantana* var. *lantana*
- b Lamina secondary veins varying from 5-11/side, margin dentate with often <30 teeth/side.
 *V. glomeratum*

GROUP D:

LAMINA BASE (at least in part of the leaves)
with CIRCULAR GLANDS (check several leaves with 10x LENS)

- 01 a Lamina US lepidote, changing grayish or dusty waxy , especially if touched/crushed.
 *V. cylindricum*
- b Lamina US elepidote. 02
- 02 a Leaves usually in whorls of three, elliptic to oblong, apex acute to acuminate. *V. ternatum*
- b Leaves opposite. 03
- 03 a Secondary veins ≤ 4 /side (lamina extremely variable on the same plant). *V. foetidum*
- b Secondary veins ≥ 4 /side. 04
- 04 a Lamina elliptic to orbicular, midvein length <2(-3) cm. Secondary veins 4-5(-6)/side.
 *V. parvifolium*
- b Lamina midvein length >3 cm AND/OR secondary veins ≥ 5 /side. 05
- 05 a Petiole ≤ 6 mm, +/- whitish pubescent. *V. erosum*
- b Petiole ≥ 6 mm, OR variable 3-15 mm and yellowish/brownish pubescent. 06
- 06 a Petiole densely pubescent, current year shoot often (densely) pubescent. Previous year shoot often pubescent. 07
- b Petiole AND current year shoot glabrous or glabrescent, or minutely scurfy pubescent and only detectable with lens. 11
- 07 a Petiole densely pubescent with +/- erect, long, yellowish/rusty hairs (examine short shoot- or basal long shoot leaves only). *V. corylifolium*
- b Petiole pubescence different. 08
- 08 a Lamina LS densely stellate-pubescent with touching and overlapping hairs. *V. fordiae*
- b Lamina LS sparsely stellate-pubescent. 09
- 09 a Lamina abaxially with glandular dots. *V. dilatatum*
- b Lamina abaxially without glandular dots. 10

- 10 a Lamina apex acute to acuminate, petiole 3-10 (15) mm. *V. luzonicum*
 b Lamina apex acuminate to caudate, petiole 10-25 mm. *V. mullaha*
- 11 a Lamina LS venation pubescent with dispersed long silky hairs. 12
 b Lamina LS venation glabrous, OR IF pubescent then with dispersed short hairs or stellate hairs. 14
- 12 a Lamina (at least for most of the leaves) ovate oblong, L/W predominantly >2/1, base rounded. *V. setigerum*
 b Lamina obovate or broadly ovate to broadly elliptic, L/W predominantly <2/1. 13
- 13 a Bud densely yellowish pubescent with short stellate hairs (petiole greenish to greenish red and sparsely pubescent with stellate and single hairs. Fruit black). *V. melanocarpum*
 b Bud glabrous to sparsely pubescent with long hairs (petiole purplish red and appressed pubescent with long hairs. Fruit dark red). *V. wrightii*
- 14 a Lamina LS secondary vein axils glabrous. 15
 b Lamina LS secondary vein axils pubescent. 17
- 15 a Lamina US glossy and midvein glabrous, LS with 1-4 circular glands/side close to and some touching the basal secondary vein. *V. japonicum*
 b Lamina US dull and midvein pubescent, LS with 0-2 circular glands/side distant from the basal secondary vein. 16
- 16 a Lamina LS venation variably pubescent (single hairs, fasciculate hairs, stellate hairs).
 *V. betulifolium* sensu lato: *V. hupehense*
 b Lamina LS venation glabrous *V. betulifolium* × *V. japonicum* ('Huron')
- 17 a Lamina apex acute to acuminate. Petiole slender, 10-40 mm. *V. betulifolium* sensu lato
- Following taxa all referred to the variable *V. betulifolium* in FOC:
- Petiole stipulate. Lamina margin clearly dentate.
 - Lamina LS glabrous or almost so. *V. lobophyllum*
 - Lamina LS stellate pubescent. *V. flavescens*
 - Petiole exstipulate.
 - Lamina ovate to oblong ovate, broadly ovate to obovate on the same plant, margin clearly dentate. *V. betulifolium*
 - Lamina ovate to oblong ovate, margin remotely dentate to entire.
 - Shoot and petiole glabrous. *V. dasyanthum*
 - Shoot and petiole (sometimes minutely) pubescent.
 - Lamina LS sparsely stellate pubescent. *V. ovatifolium*
 - Lamina LS clearly stellate pubescent, venation pubescent with long hairs. *V. wilsonii*
- b Lamina apex acute to obtuse. Petiole thick, 10-20 mm. 18
- 18 a Lamina margin with >15 teeth/side at least in part of the leaves.
 *V. dilatatum* × *V. japonicum* (*V. 'Chippewa'*)
 b Lamina margin with <15 teeth/side. *V. betulifolium* × *V. dilatatum* (*V. 'Oneida'*)

GROUP E:

LAMINA MARGIN ENTIRE TO MINUTELY DENTATE.
SEVERAL SECONDARY VEINS ARCHING
AND SEVERAL FORKS ANASTOMOSING BEFORE THE MARGIN

- 01 a Lamina LS secondary vein axils with crater-like domatia (10× LENS) and simultaneously US vein axils bubbly raised often visible to the naked eye. *V. odoratissimum*
- Lamina US glossy green. *V. odoratissimum* var. *awabuki*
 - Lamina US dull green.
 - Secondary veins 4-6/side. *V. odoratissimum* var. *odoratissimum*
 - Secondary veins 6-9/side. *V. odoratissimum* var. *arboricola*
- b Lamina without or with only tiny, never crater-like domatia (10× LENS). 02
- 02 a Lamina LS and petiole glabrous or pubescent with single hairs; stellate-pubescent and minutely glandular dots absent (10× LENS). 03
- b Lamina LS and petiole stellate-pubescent (sometimes scattered, use LENS!!!), OR minutely glandular dotted to scurfy (10× LENS). 15
- 03 a Lamina US adpressed pubescent with long hairs. *V. rigidum*
- b Lamina US glabrous or almost so. 04
- 04 a Lamina entire to remotely dentate (often in apical 2/3) with teeth reduced to their tips. 05
- b Lamina at least in part of the leaves finely serrate-dentate (teeth not reduced to tips), OR serrate-dentate to crenate-dentate in apical 2/3 (some almost entire leaves may also occur). 11
- 05 a Lamina margin always entire. 06
- b Lamina margin at least in part of the leaves remotely dentate (often in apical 2/3) with teeth reduced to their tips. 07
- 06 a Leaves all opposite. Lamina ovate to elliptic or lanceolate (apex acute to acuminate, rarely obtuse to rounded). AND LS pubescent at least in basal vein axils. *V. tinus*
- Lamina broadly elliptic, +/- convex. Apex obtuse to rounded. *V. tinus* subsp. *subcordatum*
 - Lamina ovate. Shoot and petiole bristly pubescent. *V. tinus* f. *hirtum*
- b Leaves often in whorls of 3 (rarely 4). Lamina +/- orbicular (apex obtuse to emarginated and with gland at tip). AND LS glabrous. *V. harryanum*
- 07 a Shoot hirsute, lamina margin clearly ciliate. *V. lautum*
- b Shoot not hirsute, lamina margin glabrous or almost so. 08
- 08 a Most to all leaves with lamina L/W ≥3/1. 09
- b Leaves variable with lamina L/W <3/1. 10

- 09 a Lamina entire in basal part. Central secondary vein angle $<30^\circ$ *V. henryi*
- b Lamina at least in part of the leaves minutely dentate towards base. Central secondary vein angle $30-45^\circ$ *V. \times globosum*
- 10 a Lamina apex (abruptly) acuminate. *V. erubescens*
- b Lamina apex (sub-)acute and mucronate. *V. atrocyaneum*
- 11 a Secondary veins ≥ 9 /side (at least for the large leaves) AND/OR with numerous intercalary veins. Margin finely serrate often over the whole length. *V. prunifolium*
- b Secondary veins ≤ 9 /side AND with 0 to a few intercalary veins. 12
- 12 a Lamina apex obtuse to acute. 13
- b Lamina apex acute to acuminate. 14
- 13 a Previous year shoot warty. Lamina margin crenate-dentate in apical 2/3 (some leaves almost entire). *V. suspensum*
- b Previous year shoot not warty. *V. chingii*
- 14 a Petiole usually red to purplish red. *V. erubescens*
- b Petiole usually red to rosy red or partly greenish. *V. \times hillieri*
- 15 a Petiole, lamina LS midvein and surface minutely dotted, stellate hairs absent. 16
- b Dots absent, OR IF dotted then also simultaneously stellate pubescent with pale or whitish hairs. 20
- 16 a Lamina midvein length ≤ 5 cm. Secondary veins 3-4(-5)/side. *V. obovatum*
- b Lamina midvein length ≥ 5 cm. Secondary veins >5 /side. 17
- 17 a Petiole wing irregularly dentate revolute. *V. lentago*
- b Petiole not irregularly dentate revolute. 18
- 18 a Lamina (narrowly) oblong $>2/1$, margin entire (rarely crenulate in part). *V. nudum*
- b Lamina elliptic $<2/1$, margin finely serrate-dentate. 19
- 19 a Lamina LS and US shiny. *V. rufidulum*
- b Lamina LS and US dull. *V. cassinoides*
- 20 a Lamina L/W $>2/1$ at least for several leaves. 21
- b Lamina L/W $<2/1$ 26
- 21 a Lamina LS stellate pubescent with continuous layer of adpressed stellate hairs. 22
- b Lamina LS scattered stellate pubescent to glabrescent, layer not continuous and/or with +/- erect stellate hairs. 23
- 22 a Secondary veins 4-6/side. *V. \times burkwoodii*
- b Secondary veins ≥ 6 /side. *V. 'Chesapeake'*

23 a	Lamina apex obtuse to acute.	<i>V. chingii</i>
	b Lamina apex acute to acuminate or caudate.	24
24 a	Lamina apex acuminate to caudate.	<i>V. urceolatum</i>
	b Lamina apex acute to (abruptly) acuminate.	25
25 a	Tertiary veins obvious on both surfaces.	<i>V. erubescens</i>
	b Tertiary veins less visible.	<i>V. ×hillieri</i>
26 a	Lamina entire. Evergreen.	27
	b Lamina margin dentate. Deciduous.	28
27 a	Lamina LS stellate pubescent, secondary veins 4/side, intercalary veins few or absent.	<i>V. congestum</i>
	b Lamina LS glabrescent, secondary veins 5-6/side, intercalary veins numerous.	<i>V. tinoides</i>
28 a	Lamina apex acute.	29
	b Lamina apex obtuse to acute.	31
29 a	Lamina LS venation stellate pubescent, surface glabrescent, margin regularly acutely dentate.	<i>V. burejaeticum</i>
	b Lamina LS stellate pubescent over the whole surface.	30
30 a	Lamina LS stellate pubescent with mainly +/- distant scurfy short branched stellate hairs.	<i>V. ×carlcephalum</i>
	b Lamina LS stellate pubescent with mainly almost touching long branched hairs.	<i>V. carlesii</i>
	- Lamina broadly ovate.	
	- Flower Ø 10-14 mm.	<i>V. carlesii</i> var. <i>carlesii</i>
	- Flower Ø 8 mm.	<i>V. ×judii</i>
	- Lamina ovate to oblong. Flower Ø 10 mm.	<i>V. carlesii</i> var. <i>bitchiuense</i>
31 a	Lamina midvein length 5-11 cm.	<i>V. macrocephalum</i>
	- Inflorescence with sterile flowers only.	<i>V. macrocephalum</i>
	- Inflorescence with radiant sterile flowers and central fertile flowers.	<i>V. macrocephalum</i> f. <i>keteleeri</i>
	b Lamina midvein length 3-6 cm.	32
32 a	Lamina predominantly: ovate (largest width below the middle) AND apex acute to obtuse.	<i>V. mongolicum</i>
	b Lamina predominantly: elliptic (largest width in the middle) AND apex obtuse to rounded.	<i>V. schensianum</i>

GROUP F:

**LAMINA MARGIN DENTATE
WITH SECONDARY VEINS AND FORKS
PREDOMINANTLY DIRECTLY ENDING IN TEETH**

- 01 a All leaves with secondary veins 4-6/side. 02
 b At least in part of the leaves secondary veins ≥ 6 /side. 10
- 02 a Lamina base (sub-)rounded to (broadly) cuneate. 03
 b Lamina base rounded to (sub-)cordate. 05
- 03 a Lamina with unpleasant scent when touched. Secondary veins 8-12/side. *V. sieboldii*
 - Lamina obovate-oblong, base cuneate. *V. sieboldii* var. *sieboldii*
 - Lamina obovate to broadly obovate, base cuneate to (sub-)rounded. *V. sieboldii* var. *obovatifolium*
 b Lamina without unpleasant scent when touched. Secondary veins 4-6/side. 04
- 04 a Lamina midvein length 6-15 cm, apex acute to caudate. *V. erubescens*
 b Lamina midvein length 4-9 cm, apex obtuse to acute. *V. chingii*
- 05 a Lamina margin coarsely dentate, ≤ 14 teeth/side. 06
 b At least the largest leaves with lamina margin >15 teeth/side. 08
- 06 a Petiole stipulate. *V. rafinesquianum*
 - Lamina LS variable pubescent with long single or fasciculate hairs. ... *V. rafinesquianum* var. *rafinesquianum*
 - Lamina LS almost glabrous except veins and basal part. *V. rafinesquianum* var. *affine*
 b Petiole exstipulate. 07
- 07 a Lamina margin coarsely crenate-dentate. *V. dentatum* var. *scabrellum*
 b Lamina margin coarsely acutely dentate. *V. bracteatum*
- 08 a Lamina margin regularly shallowly dentate to (sub-)entire. Petiole 10-17 mm.
 *V. cotinifolium*
 b Lamina margin predominantly irregularly and acutely dentate. Petiole ≤ 10 mm. 09
- 09 a At least in part of the leaves lamina LS midvein and petiole densely stellate pubescent
 with a dense layer covering midvein and petiole surface. *V. ×burkwoodii*
 b Lamina LS midvein and petiole stellate pubescent but not covering midvein and petiole
 surface. *V. carlesii*
 - Lamina broadly ovate.
 - Flower \varnothing 10-14 mm. *V. carlesii* var. *carlesii*
 - Flower \varnothing 8 mm. *V. ×judii*
 - Lamina ovate to oblong. Flower \varnothing 10 mm. *V. carlesii* var. *bitchiuense*

- 10 a Lamina base predominantly cuneate to +/- attenuate. 11
- b At least several to all leaves with lamina base: truncate, or (sub-)cordate, or rounded, or broadly cuneate. 13
- 11 a Petiole green. Secondary veins 8-14/side (lamina with unpleasant scent when touched).
..... *V. sieboldii*
- b Petiole reddish at least in part. Secondary veins 5-9/side (lamina with slightly unpleasant scent when touched)..... 12
- 12 a Lamina predominantly: obovate AND $\leq 5-7$ secondary veins/side AND petiole/midvein length often $>2/1$ AND base cuneate to attenuate. *V. farreri*
- b Lamina predominantly: elliptic and obovate AND $\leq 6-8$ secondary veins/side AND petiole/midvein length $<2/1$ AND base cuneate and rounded. *V. × bodnantense*
- 13 a All leaves with margin (sinuate) dentate +/- from base to apex, with ≤ 20 coarse triangular teeth/side. *V. dentatum*
- Petiole often stipulate.
 - Lamina LS pubescent at least on venation. *V. dentatum* var. *deamii*
 - Petiole exstipulate.
 - Lamina LS pubescence usually restricted to vein axils. *V. dentatum* var. *lucidum*
 - Lamina LS pubescent on venation. *V. dentatum* var. *dentatum*
- b At least part of the leaves (adult growth) with margin minutely dentate to (partly) entire, OR sharply double-serrate-dentate with >20 teeth/side. 14
- 14 a Lamina US pubescence restricted to venation. 15
- b Lamina US pubescence scattered over the surface (depending the season) and at least clearly noticeable at base and margin. 22
- 15 a Lamina broadly ovate to obovate or (sub-)orbicular. 16
- b Lamina ovate to elliptic or lanceolate. 17
- 16 a Petiole stipulate. Lamina largest width in or above middle. *V. lantanoides*
- b Petiole exstipulate. Lamina largest width in or below middle. *V. furcatum*
- 17 a Bud almost glabrous, surface at least partly visible. *V. grandiflorum*
- Lamina LS glabrous. *V. grandiflorum* f. *foetens*
 - Lamina LS venation stellate pubescent. *V. grandiflorum* f. *grandiflorum*
- b Bud densely stellate pubescent, surface covered. 18
- 18 a Leaves predominately with lamina L/W $\geq 3/1$ *V. henryi*
- b Leaves variable with lamina L/W: $2/1-3/1$ 19
- 19 a Lamina apex obtuse to abruptly acute. 20
- b Lamina apex acute to (abruptly) acuminate. 21

- 20 a Lamina LS almost glabrous except sometimes stellate pubescent venation, margin coarsely dentate, largest width in the middle. *V. chingii*
- b Lamina LS stellate pubescent, margin minutely dentate, largest width in or below the middle. *V. 'Chesapeake'*
- 21 a Lamina margin variably dentate on the same plant, and at least in part of the leaves entire in basal half. *V. ×hillieri*
- b Lamina margin regularly dentate on the same plant, varying from finely to sharply dentate (very variable species). *V. erubescens*
- 22 a All leaves with lamina margin regularly coarsely dentate. 23
- b At least part of the leaves (adult growth) with lamina margin variable: +/- regularly dentate to partly entire or with teeth reduced to their tips. 25
- 23 a Lamina base broadly cuneate to rounded. *V. plicatum*
- b Lamina base rounded to cordate. 24
- 24 a Lamina secondary veins 8-12/side, margin dentate with >50 teeth/side. *V. lantana*
- b Lamina secondary veins 5-9, margin dentate with often <30 teeth/side. *V. glomeratum*
- 25 a Lamina ovate to broadly ovate, US +/- flat (not rugose), petiole ≤2 cm. 26
- b Lamina ovate to oblong, US rugose, petiole variable 1-4 cm. 27
- 26 a Current year shoot and petiole yellowish to rusty pubescent. Lamina margin acutely dentate to partly entire. *V. tiliifolium*
- b Current year shoot and petiole whitish pubescent. Lamina margin at least in part of the leaves +/- superficially dentate. *V. cotinifolium*
- 27 a Lamina US glossy dark green, secondary veins 8-10/side. *V. ×rhytidophylloides*
- b Lamina US dull green, secondary veins 8-13/side. *V. ×rhytidocarpum*

Taxa treated in this identification key.

V. acerifolium
V. atrocyaneum
V. betulifolium sensu lato
 - *V. betulifolium*
 - *V. dasyanthum*
 - *V. flavescens*
 - *V. lobophyllum*
 - *V. ovatifolium*
 - *V. wilsonii*
V. betulifolium × *V. dilatatum* (= *V. 'Oneida'*)
V. betulifolium × *V. japonicum* (= *V. 'Huron'*)
V. bütchiuense
V. ×bodnantense (*V. farreri* × *V. grandiflorum*)
V. bracteatum
V. buddleifolium
V. burejaeticum
V. ×burkwoodii (*V. carlesii* × *V. utile*)
V. carlesii
 - var. *bütchiuense*
 - var. *carlesii*
V. chingii
V. cinnamomifolium
V. congestum
V. corylifolium
V. cotinifolium
V. cylindricum
V. davidii
V. dentatum
 - var. *deamii*
 - var. *dentatum*
 - var. *lucidum*
 - var. *scabrellum*
V. dilatatum
V. dilatatum × *V. japonicum* (*V. ×hizenense?* = *V. 'Chippewa'*)
V. edule
V. ellipticum
V. erosum
V. erubescens
V. farreri
V. foetidum
V. fordiae
V. furcatum
V. ×globosum 'Jermyns Globe' (*V. atrocyaneum* × *V. davidii*)
V. glomeratum
V. grandiflorum
 - f. *foetidum*
 - f. *grandiflorum*
V. harryanum
V. henryi
V. ×hillieri (*V. erubescens* × *V. henryi*)
V. japonicum

V. ×judii (*V. carlesii* × *V. carlesii* var. *bütchiuense*)
V. kansuense
V. lantana
 - var. *discolor*
 - var. *lantana*
V. lantanoides
V. lautum
V. lentago
V. luzonicum
V. macrocephalum
V. melanocarpum
V. mongolicum
V. mullaha
V. nudum
V. obovatum
V. odoratissimum
 - var. *arboricola*
 - var. *awabuki*
 - var. *odoratissimum*
V. opulus
 - var. *americanum*
 - var. *calvescens*
 - var. *opulus*
V. orientale
V. plicatum
V. 'Pragensis'
V. propinquum
V. prunifolium
V. rafinesquianum
 - var. *affine*
V. ×rhytidocarpum (*V. rhytidophyllum* × *V. buddleifolium*)
V. rhytidophyllum
V. ×rhytidophylloides (*V. rhytidophyllum* × *V. lantana*)
V. rigidum
V. rufidulum
V. sargentii
V. schensianum
V. setigerum
V. sieboldii
 - var. *obovatifolium*
V. suspensum
V. ternatum
V. tiliifolium
V. tinoides
V. tinus
 - subsp. *cordatum*
V. urceolatum
V. utile
V. wrightii

Taxa referred to synonymy in this identification key.

V. affine = *V. rafinesquianum* var. *affine*
V. alnifolium = *V. lantanoides* (GRIN, BONAP)
V. arboricola = *V. odoratissimum* var. *arboricola* (FOC)
V. ashei = *V. dentatum* var. *scabrellum* (GRIN, BONAP)
V. atrocyaneum subsp. *harryanum* = *V. harryanum* (#FOC)
V. calvum = *V. atrocyaneum* (FOC)
V. coriaceum = *V. cylindricum*
V. cordifolium = *V. nervosum*
V. dasyanthum = *V. betulifolium* (FOC)
V. dentatum var. *pubescens* = *V. dentatum* var. *dentatum* (GRIN, BONAP)
V. dentatum var. *semitomentosum* = *V. dentatum* var. *dentatum* (GRIN, BONAP)
V. flavescens = *V. betulifolium* (FOC)
V. foetens = *V. grandiflorum*
V. fragrans = *V. farreri* (FOC)
V. huphense = *V. betulifolium* (FOC)
V. ichangense = *V. erosum*

V. ×lantanoxyllum = *V. ×rhytidophylloides*
V. lobophyllum = *V. betulifolium* (FOC)
V. ovatifolium = *V. betulifolium* (FOC)
V. pubescens = *V. dentatum* (GRIN, BONAP)
V. sphaerocarpum = *V. odoratissimum* var. *arboricola* (FOC)
V. recognitum = *V. dentatum* var. *lucidum* (GRIN, BONAP)
V. scabrellum = *V. dentatum* var. *scabrellum* (GRIN, BONAP)
V. semitomentosum = *V. dentatum* var. *dentatum* (GRIN, BONAP)
V. stellulatum = *V. mullaha* (FOC)
V. taiwanianum = *V. urceolatum* (FOC)
V. tomentosum = *V. plicatum* var. *tomentosum*
V. trilobum = *V. opulus* var. *americanum* (GRIN)
V. veitchii = *V. glomeratum* (FOC)
V. wilsonii = *V. betulifolium* (FOC)

Questionable/frequently misapplied names.

Quite some *Viburnum* plants in collections are wrong to name, this is also confirmed by Valéry Malecot.

Although some rarer taxa should be presented in a few collections, during the work on this key no true representatives of the following taxa were found:

V. annamensis, *V. brachyandrum*, *V. chinshanense*, *V. corymbiflorum*, *V. dalzielii*, *V. fansipanense*, *V. griffithianum*, *V. hanceanum*, *V. hoanglienense*, *V. koreanum*, *V. molle*, *V. nervosum*, *V. oliganthum*, *V. phlebotricum*, *V. pinchinchense*, *V. punctatum*, *V. sambucinum*, *V. subalpinum*, *V. sympodiale*, *V. taitoense*, *V. triphyllum* and *V. venustum*.

In some cases the only representatives were severely damaged, some dead and others were too small. In other cases the plants were misidentified. These taxa could not be seriously studied to present in this key.

Some other frequent mistakes are:

V. acerifolium Hort. = *V. opulus*
V. congestum Hort. = *V. foetidum*
V. edule Hort. = *V. opulus*
V. hanceanum Hort. = *V. dentatum*
V. kansuense Hort. = *V. opulus*
V. koreanum Hort. = *V. opulus*
V. luzonicum Hort. = *V. foetidum*
V. nervosum Hort. = *V. dentatum*
V. parvifolium Hort. = *V. foetidum*
V. punctatum Hort. = *V. cylindricum*
V. schensianum Hort. = *V. lantana*
V. subalpinum Hort. = *V. erubescens*, and also *V. erubescens* var. *gracilipes*
V. sympodiale Hort. = *V. betulifolium*
V. taitoense Hort. = *V. odoratissimum* var. *arboricola*, and also *V. macrocephalum*

