



Ghent University Botanical Garden

The genus *Acer* L.

(Sapindaceae)

**Identification key for the species of the genus,
based on vegetative features, from specimens in West-European collections.**

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This key is based on vegetative characteristics, visible during the longest possible period of the year, rarely observation is founded on flower or fruit.

Acer is a large genus, with numerous species. This table assembles only these in general culture and in specialised collections. Major hybrids, infraspecific taxa, and some rare species, are discussed (in lower case) under the parents or respectively related taxon.

To improve practice:

- Use a hand lens to judge bud scale scars and hairiness.
- Features like hairiness and presence of milky sap, can decrease during Autumn.
- Look at the entire plant. Young specimens and strong shoots give a distorted view.
- Beware of hybridisation, especially with plants raised from seed gathered in collections.

Features based on:

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

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NOTE: Imaged taxa () are ordered alphabetically by section, following 'Maples of the World'.

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

1 a	Leaf compound, leaflets ≥ 3 (sometimes single leaf present).	2
b	Leaf always simple.	10
2 a	Leaf digitate.	☐ <i>A. pentaphyllum</i> (Pentaphylla)
b	Leaf pinnate.	3
3 a	Plant with hairs on shoot <u>AND/OR</u> leaf, petiole, fruit, pedicel.	4
b	Plant completely glabrous.	18
4 a	Leaflets ≥ 3 , abaxially green or pale green. Shoot at base with 2-3 (4-5) pairs of bud scale scars (terminal bud ≤ 5 pairs of bud scales). Sectio NEGUNDO .	5
b	Leaflets always 3, abaxially blue-green. Shoot at base with >5 pairs of bud scale scars (terminal bud >5 pairs of bud scales). Sectio TRIFOLIATA .	7
5 a	Leaflets 3-5 (7-9). <u>IF</u> 3: terminal leaflet and lateral leaflets often different in shape. Petiolule terminal leaflet often $\geq 3 \times$ longer than that of lateral leaflets.	☐ <i>A. negundo</i> (Negundo)
-	Shoot +/- glabrous.	
o	Leaflets 3-7 (9), ≥ 3 cm broad, abaxially glabrous.	<i>A. negundo</i> subsp. <i>negundo</i>
o	Leaflets 3, ≤ 3 cm broad, abaxially densely hairy.	<i>A. negundo</i> subsp. <i>mexicanum</i>
-	Shoot hairy.	
o	Leaflets 3 (-5?), abaxially glabrous or lightly hairy on midrib.	<i>A. negundo</i> subsp. <i>interius</i>
o	Leaflets 3-7, ovate, (at first) densely and white hairy.	<i>A. negundo</i> subsp. <i>californicum</i>
b	Leaflets always 3. Terminal leaflet and lateral leaflets +/- similar in shape. Petiolule (mature) terminal leaflet rarely $2-3 \times$ longer than that of lateral leaflets.	6
6 a	Leaf margin ciliate. Leaflets coarsely serrate to dentate.	☐ <i>A. cissifolium</i> (Negundo/Cissifolia)
b	Leaf margin glabrous. Leaflets entire or with a few small teeth at margin, but on strong shoots and young plants often serrate (dentate).	☐ <i>A. henryi</i> (Negundo/Cissifolia)
7 a	Petiole glabrous. Leaflet not undulate at margin, +/- regular serrate, ≥ 10 teeth per side. Bark smooth.	☐ <i>A. mandshuricum</i> (Trifoliata/Mandshurica)
b	Petiole hairy. Leaflet often undulate at margin, irregular coarsely and bluntly toothed to lobed, <8 teeth per side. Bark smooth, fissured or peeling.	8
8 a	Bark smooth. Leaflet +/- undulate at margin, from top to base, with not- to shallowly increasing, <5 mm deep teeth.	☐ <i>A. maximowiczianum</i> (Trifoliata/Grisea)
b	Bark fissured or peeling. Leaflet, from top to base, with increasing 5-15 mm deep teeth.	9
9 a	Bark cinnamon coloured, peeling in papery horizontal curls. Bud short and thick.	☐ <i>A. griseum</i> (Trifoliata/Grisea)
-	different: bark vertically fissured and/or horizontal peeling, leaf with features between the parents.	☐ <i>A. griseum</i> \times <i>A. maximowiczianum</i>
b	Bark grey-beige, coarse and fibrous, vertically fissured. Bud long and slender.	☐ <i>A. triflorum</i> (Trifoliata/Grisea)
10 a	Shoot at base with 2-4 pairs of bud scale scars. Terminal bud elongated and stalked, (closed with 2 pair +/- valvate scales). <u>OR</u> terminal bud on vegetative shoot often reduced and 2 buds on shoot end.	11
b	Shoot at base with ≥ 4 pairs of bud scale scars. Terminal bud ovoid to long ovoid, not stalked (closed with ≥ 4 pairs bud scales).	38

11	a	Petiole >2 cm (leaf different from 11b).	12
	b	Petiole <2 cm <u>AND</u> leaf leathery, unlobed, >2 x longer than broad, at least partly or fully entire at margin. Sectio PALMATA/Penninervia	75
12	a	Leaf 3-lobed <u>AND</u> lobes slender finger-like, <u>AND</u> (long) caudate. Sectio WARDIANA (sectio PALMATA/Sinensia).	79
	b	Leaf different.	13
13	a	Terminal bud vegetative shoot rarely reduced, +/- elongated and stalked. Shoot at base with 2-3 pairs of bud scale scars.	14
	b	Terminal bud vegetative shoot reduced. Shoot at base with 2-4 pairs of bud scale scars. Sectio PALMATA	77
14	a	Shoot at base with 2-3 pairs of bud scale scars. Lamina abaxially without membranous domatia in vein axils. Sometimes vague, +/- green-yellow bark stripes on trunk, branch, shoot. Sectio PARVIFLORA and GLABRA	15
	b	Shoot at base with 2 pairs of bud scale scars. Lamina abaxially with membranous domatia in vein axils (when vein axils are densely hairy, remove the hairs to examine this). Often conspicuous blue-green bark stripes on trunk, branch, shoot. Sectio MACRANTHA	23
15	a	Leaf lobed <u>AND</u> terminal lobe broader than long. Lamina average 15-20 cm across. Bark without stripes. A. nipponicum (Parviflora/Parviflora)	
	b	Leaf lobed <u>AND</u> terminal lobe longer than broad. <u>OR</u> leaf unlobed. Lamina smaller. Bark sometimes with light stripes.	16
16	a	Leaf unlobed, resembling a Tilia leaf, <u>AND</u> cordate at base. Margin +/- regular serrate-dentate at margin. No bark stripes. A. distylum (Parviflora/Distyla)	
	b	Leaf different.	17
17	a	Bark rough, +/-peeling and/or flaking. Hairiness yellowish to +/- rusty coloured, mainly on bud, top petiole (veins abaxial). A. caudatum (Parviflora/Caudata)	
	-	Leaf margin finely serrate. Lobes acuminate, sharply serrate at apex. A. caudatum subsp. caudatum	
	-	Leaf margin coarsely serrate. Lobes acute to acuminate, entire at apex. A. caudatum subsp. ukurunduense	
	b	Bark smooth or slightly fissured. Hairiness whitish, fading or absent.	18
18	a	Lamina abaxially pale green to blue-green <u>AND</u> fully glabrous. A. glabrum (Glabra/Glabra)	
	-	Leaf mainly simple (deeply lobed leaf and/or compound leaf can be present).	
	o	Leaf <6 cm across. A. glabrum subsp. glabrum	
	o	Leaf >6 cm across. A. glabrum subsp. douglasii	
	-	Leaf compound; with 3 leaflets, or almost so. A. glabrum subsp. neomexicanum	
	b	Lamina abaxially green to grey-green <u>AND</u> at least with hairs in vein axils.	19
19	a	Leaf lobed <u>AND</u> terminal lobe coarsely toothed, per side <15 teeth.	20
	b	Leaf different.	21
20	a	Lamina 8-17 cm long. Terminal lobe 1/3-1/2 length lamina, base rarely narrowed. Sinus between lobes sharp, not narrow. A. spicatum (Parviflora/Caudata)	
	b	Lamina <10 cm long. Terminal lobe 1/2-2/3 length lamina, base narrowed. Sinus between lobes narrow. A. barbinerve (Glabra/Arguta)	

- 21 a Leaf unlobed, OR unlobed AND weakly 3-lobed (<2 cm long). **A. stachyophyllum** (Glabra/Arguta)
- Multi-stemmed and invasive suckers from base. Lamina often <5 cm. **A. stachyophyllum** subsp. **betulifolium**
- Multi-stemmed. Lamina often >5 cm. **A. stachyophyllum** subsp. **stachyophyllum**
- b Leaf 3- to 5-lobed. Lateral lobes >2 cm long. 22
- 22 a Leaf 3- to 5-lobed, ≤15 cm long, smooth/soft to the touch. Terminal lobe ≥1/2 length lamina. Lateral lobes caudate. Lamina abaxially hairy in vein-axils. **A. acuminatum** (Glabra/Arguta)
- b Leaf (3-) 5- (7-) lobed, <10 cm long, rough to the touch. Terminal lobe ≤1/2 length lamina. Lateral lobes acuminate. Lamina abaxially hairy in vein-axils AND on venation. **A. argutum** (Glabra/Arguta)
- 23 a Mature lamina unlobed, OR unlobed AND weakly lobed (<2 cm). 24
- b Mature lamina mainly lobed. 29
- 24 a Leaf margin fully or partly entire, at the very most with some shallow teeth. **A. sikkimense** (Macrantha)
- b Leaf margin different. 25
- 25 a Unlobed leaf ≥2 × longer than broad AND/OR leaf apex gradually caudate. Lamina never wrinkled or bulged, sometimes (weakly) 3-lobed AND lateral lobes near the base. 26
- b Unlobed leaf <2 × longer than broad AND/OR leaf apex abruptly (+/- long) acuminate. Lamina sometimes wrinkled or bulged, sometimes (weakly) 3- to 5-lobed AND lateral lobes near the middle. 28
- 26 a Lamina 7-14 × 4-8 cm AND petiole often >4 cm. **A. pectinatum** subsp. **laxiflorum** (Macrantha)
- b Lamina ≤10 × 4 cm AND petiole <3 (4) cm. 27
- 27 a Leaf apex sharp and deeply serrate, +/- caudate, with pointed tip. **A. caudatifolium** (Macrantha)
- b Leaf apex shallowly serrate, acuminate to caudate, with rounded tip. **A. crataegifolium** (Macrantha)
- 28 a Domatia obvious, ALSO in axils between lateral veins and veinlets (LENS!)
- Lamina (mostly) <15 cm long, +/- flat to +/- wavy, never faint or wrinkled. Very variable species (lamina unlobed to shallowly lobed, margin sharp to bluntly toothed, lamina 1,5 to 2 × as long as broad)..... **A. davidii** (Macrantha)
- o Lamina >7 cm long, unlobed to weakly 3-lobed. **A. davidii** subsp. **davidii**
- o Lamina <7 cm long, shallowly 3- to 5-lobed (unlobed on old and weak shoot). **A. davidii** subsp. **grosseri**
- Lamina 10-30 cm long, often curved or bulged and faint or wrinkled. Hybrid between **A. davidii** and **A. pensylvanicum**. **A. ×conspicuum**
- b Domatia only in axils between midrib and lateral veins. Margin sharply serrate. Leaf apex caudate. **A. morifolium** (Macrantha)
- 29 a Sinus between terminal and lateral lobe very narrow and deep, by which the lobes almost touch at base or often partly overlap. 30
- b Sinus between terminal and lateral lobe broad, with a lot of space between the lobes. 31

- 30 a Terminal lobe and lateral lobes gradually caudate. Fruits >10, in narrow long pendulous racemes. Autumn colour +/- red. Lamina abaxially with short dark brown hairs in basal and +/- in other vein axils. **A. micranthum** (Macrantha)
- b Terminal lobe and lateral lobes rather abruptly acuminate. Fruits <10, initially in erect racemes. Autumn colour often yellowish. Lamina abaxially with long rusty hairs in basal vein axils, +/- on venation and petiole. **A. tschonoskii** (Macrantha)
- Lobes acuminate. Petiole and shoots not or vaguely red. **A. tschonoskii** subsp. **tschonoskii**
 - Lobes acuminate to +/- caudate. Shoot and petiole red tinged to conspicuous red (synonym: **A. komarovii**, **A. tschonoskii** var. **australe**, **A. tschonoskii** var. **rubripes**). **A. tschonoskii** subsp. **koreanum**
- 31 a Young shoot conspicuous covered with +/- whitish-blue bloom (real shoot colour difficult or not at all visible). 32
- b Young shoot different. 33
- 32 a Lamina abaxially with rusty coloured hairs on venation and vein axils (fading feature). **A. rufinerve** (Macrantha)
- b Lamina abaxially different. **A. tegmentosum** (Macrantha)
- 33 a Lamina >12-15 cm long, often up to 25 cm long and 10- 20 cm broad. **A. pensylvanicum** (Macrantha)
- **Different:** Lamina often curved or bulged and faint or wrinkled. Lateral lobes sometimes weakly developed or absent. Hybrid between **A. davidii** and **A. pensylvanicum**. **A. xconspicuum**
- b Lamina <12-15 cm long. 34
- 34 a Terminal lobe longer than broad AND the reverse on the same tree (often on the same shoot). Leaf margin with an average of <7 teeth/cm. 35
- b Terminal lobe obvious longer than broad. Leaf margin with ≥7 teeth/cm average (! Some taxa with coarser incisions, but then with terminal lobe always longer than broad). 36
- 35 a Leaf 5-lobed, basal lobes mostly <5 mm. Midvein with 2 pairs of basal veins AND ≥7 pairs of lateral veins. Leaf margin irregular, fine and +/- double serrate. **A. capillipes** (Macrantha)
- b Leaf 5-lobed, basal lobes mostly >5 mm. Midvein with 2 pairs of basal veins AND 4-6 (rarely 8) pairs of lateral veins. Leaf margin irregular, coarsely serrate. **A. rubescens** (Macrantha)
- 36 a Lamina average ≤7 cm long, mostly with 2 small lateral lobes 1-2 cm long, sometimes a few leaves unlobed. **A. davidii** subsp. **grosseri** (Macrantha)
- b Lamina average >7 cm long, AND/OR lateral lobes more obvious, longer. 37
- 37 a Lamina +/- as broad as long and abaxially particular glabrous in vein axils. Taxon with doubtful status, features between **A. davidii** and **A. pectinatum**. **A. metcalfii** (Macrantha)
- b Lamina +/- as broad as long AND abaxially hairy in vein axils. OR lamina longer than broad. Very variable. **A. pectinatum** (Macrantha)
- Lamina +/- as long as broad,
 - o 3- to 5-lobed. Terminal lobe ≤1/2 lamina length, lateral lobes ovate-triangular and caudate. Margin fine and sharply serrate with +/- 1 teeth per mm. **A. pectinatum** subsp. **pectinatum**
 - o (3-) 5-lobed. Terminal lobe ≥1/2 lamina length, lateral lobes triangular and gradually acuminate. Leaf margin +/- irregular and coarsely serrate. **A. pectinatum** subsp. **maximowiczii**
 - Lamina longer than broad,
 - o (unlobed-) 3-lobed. Lateral lobes (very) small <2 cm long (base below the middle). **A. pectinatum** subsp. **laxiflorum**
 - o 3- to weakly 5-lobed. Lateral lobes >2 cm long.
 - Terminal lobe ≥1/2 lamina length. Lateral sinus below the middle of lamina. Leaf margin double serrate. **A. pectinatum** subsp. **forrestii**
 - Terminal lobe 1/3-1/2 lamina length. Lateral sinus often above the middle of lamina. Leaf margin very finely and sharply serrate with +/- 1 teeth per mm. **A. pectinatum** subsp. **taronense**

- 38 a Petiole lactiferous when broken off or cut through.
Sectio **PLATANOIDEA** and **LITHOCARPA**. 39
- b Petiole not lactiferous or sap is colourless. 50
- 39 a Terminal lobe fully entire (no leaf with toothed central lobe). 40
- b Terminal lobe with ≥ 1 tooth. OR at least so for several leaves. 44
- 40 a Shoot greenish and staying so, not woody the second (and following) growing season, eventually with red or brown, sometimes with bluish ripe or stripes. 41
- b Shoot becoming grey- to brownish woody, at least so the second growing season. 42
- 41 a Leaf unlobed and weakly 3-lobed, OR 3- to 5-lobed. Lamina rigid, firm and net-veined. Leaf base cordate. **A. amplum** (Platanoidea)
- Leaf (3-) 5-lobed.
 - o Terminal lobe often (much) broader than long, often 'broad shouldered lamina'. **A. amplum** subsp. **amplum**
 - o Terminal lobe often $>1/2$ lamina length (synonym **A. chapaense**). **A. amplum** subsp. **bodinieri**
 - Leaf unlobed to 3-lobed.
 - o Leaf 3- lobed, sinus between lobes +/- sharp, lobes directed sideward. **A. amplum** subsp. **tientaiense**
 - o Leaf unlobed to weakly 3- lobed, resembling **Catalpa**. **A. amplum** subsp. **catalpifolium**
- b Leaf 5- to 7-lobed (3-lobed leaf possible but then lamina <7 cm long). Lamina thin, papery, not net-veined. Leaf base truncate to +/- cordate. **A. cappadocicum** (Platanoidea)
- Tree with smooth bark. Leaf 5- to 7-lobed.
 - o Crown round and broad. Shoot green, sometimes lightly bloomed. Leaf 5- to 7-lobed. Hairiness lamina abaxially mainly restricted to basal vein axils. **A. cappadocicum** subsp. **cappadocicum**
 - o Crown distinctive columnar. Shoot distinctive bloomed. Leaf mainly 5-lobed (small leaf sometimes 3-lobed), margin more undulated. Hairiness lamina abaxially often in all vein axils. . **A. cappadocicum** subsp. **lobellii**
 - Small tree, bark often ridged. Leaf 5-lobed.
 - o Lamina <10 cm across. Lobes narrow and deep, especially long acuminate. **A. cappadocicum** subsp. **sinicum**
 - o Lamina ≤ 7 cm across. Lobes short, +/- blunt to acuminate (lamina sometimes firm textured, various forms cultivated) Shoot quickly reddish brown. Small tree with entangled branches. **A. cappadocicum** subsp. **divergens**
- Different, some hybrids with 5-lobed to weakly 7-lobed leaf with terminal lobe entire as well as slightly toothed:
- Terminal lobe entire as well as with blunt and rounded teeth. Features between **A. campestre** and **A. cappadocicum**. . **A. \times zoeschense**
 - Terminal lobe entire as well as with rounded and pointed teeth.
 - o Present teeth rounded to pointed at tip. Leaf margin undulate and initially ciliate. Lamina abaxially and petiole less hairy compared with **A. miyabei** (especially obvious on young leaves). Features between **A. cappadocicum** and **A. miyabei**. **A. \times hillieri**
 - o Present teeth pointed and sometimes bristly at tip. Features between **A. cappadocicum** and **A. platanoides**. **A. \times verhaegheanum**. Geerinck: in Nat. Belg., 78(1): 9 (1997). Similar hybrid in Hillier Gardens between **A. cappadocicum** subsp. **sinicum** and **A. platanoides**. **A. \times verhaegheanum**
- 42 a Lamina abaxially hairy. Leaf 3- to 5-lobed. **A. longipes** (Platanoidea)
- b Lamina abaxially glabrous, except venation and/or vein axils. Sometimes lamina abaxially densely hairy but than leaf >5 -lobed. 43
- 43 a Leaf 3-, or weakly 5- lobed, rarely unlobed, small: +/- $\leq 6 \times 6$ cm. **A. tenellum** (Platanoidea)
- b Leaf 5- to 7- (9) lobed, $>6 \times 6$ cm. Very variable species, numerous subspecies with only a few cultivated. **A. pictum** (Platanoidea)
- Lamina abaxially fully hairy. Leaf 5-7 lobed. **A. pictum** subsp. **pictum**
 - Lamina abaxially glabrous or hairy only on midrib and lateral veins.
 - o Leaf 5- to 7-lobed. **A. pictum** subsp. **mono**
 - o Leaf 7- to 9-lobed. **A. pictum** subsp. **okamotoanum**

- 44 a Teeth with bristly enlargement present. Petiole and leaf margin glabrous. 45
- b Teeth pointed or rounded, without bristly enlargement. Petiole often hairy, leaf margin ciliate (fading in Autumn and on mature leaf). 46
- 45 a Terminal lobe $>1/2$ lamina length, entire OR with ≤ 2 +/- teeth (rarely more small teeth); abaxially with weak lateral veins and glabrous vein axils. **A. truncatum** (Platanioidea)
- b Terminal lobe $<1/2$ lamina length, always toothed, often with more, (sinuous) teeth; abaxially with obvious lateral veins and hairy vein axils. **A. platanoides** (Platanioidea)
- Large tree.
 - o Leaf +/- uniform. Lobes obviously toothed, often more teeth per side. Lamina abaxially hairy in vein axils. **A. platanoides** subsp. **platanoides**
 - o Leaf very variable in shape, sometimes on the same shoot: **Some hybrids** (see also 41b):
 - Leaves like **A. platanoides** as well as (smaller) leaves like **A. truncatum** with lobes less (bristly) toothed. Features between both parents. **A. platanoides** \times **A. truncatum**
 - Teeth pointed and/or bristly. Features between **A. cappadocicum** and **A. platanoides**. **A. \times verhaegheanum**
 - Lobes sometimes absent, supposed hybrid between **A. cappadocicum** subsp. **lobelii** and **A. platanoides** (sometimes regarded as a form of the latter). **A. \times dieckii**
 - Shrub or small tree. Lobes less toothed. Lamina abaxially hairy. **A. platanoides** subsp. **turkestanicum**
- 46 a Lamina very large, 15-30 cm long, sometimes more. ... **A. macrophyllum** (Lithocarpa/Macrophylla)
- b Lamina smaller. 47
- 47 a Terminal lobe with rounded teeth OR with rounded as well as pointed teeth. 48
- b Terminal lobe with pointed teeth. 49
- 48 a Lamina average ≥ 10 cm long. Terminal lobe mostly long acuminate, margin mainly with 1-2 teeth. Hairiness more obvious: often as well on lamina adaxially as abaxially, especially on venation and petiole. **A. miyabei** (Platanioidea)
- Leaf with 3 lobes. Terminal lobe acuminate, lateral lobe rather +/- obtuse. **A. miyabei** subsp. **miaotaiense**
 - Leaf with 5 lobes. Terminal and lateral lobes acuminate.
 - o Margin with rounded teeth. Lamina abaxially and petiole obviously hairy. **A. miyabei** subsp. **miyabei**
 - o Margin with pointed to rounded teeth. Lamina abaxially and petiole less hairy (especially obvious on young leaves). Features between **A. miyabei** and **A. cappadocicum** **A. \times hillieri**
- b Lamina average ≤ 10 cm long. Terminal lobe often shorter and +/- blunt at apex, leaf margin mostly entire or with one teeth. Hairiness less obvious: more restricted to venation (mainly less obvious on lamina adaxially and petiole or lacking there). See also hybrids. **A. campestre** (Platanioidea)
- Different, some hybrids:
- Leaf 5- (to weakly 7-) lobed. Terminal lobe narrowing towards base. Lateral lobes long, with 1-2 shallow rounded teeth. Features between **A. campestre** and **A. cappadocicum**. **A. \times zoeschense**
 - Leaf 3- (to weakly 5-) lobed. Terminal lobe broadest at base. Lateral lobes short, +/- long pointed at apex, entire or almost so. Features between **A. campestre**? and **A. monspessulanum**. **A. \times bornmuelleri** (Acer Monspessulana)
- 49 a Terminal lobe not V-shaped, broadest at base, with 1 (or 2) small pointed teeth per side, AND lateral lobes entire or almost so. **A. sinopurpurascens** (Lithocarpa/Lithocarpa)
- b Terminal lobe V-shaped, narrow at base and broader above the middle. Terminal lobe AND lateral lobe with more and obvious teeth. **A. diabolicum** (Lithocarpa/Lithocarpa)
- 50 a Bud, shoot and fruit stiff- hairy (fading in Autumn). **A. sterculiaceum** (Lithocarpa/Lithocarpa)
- Leaf 3-lobed, remarkable thick, >15 cm across. Lateral lobes often small. Leaf margin coarsely toothed to entire. **A. sterculiaceum** subsp. **thomsonii**
 - Leaf 3- to more-lobed, stout to thick. Lateral lobes obvious.
 - o Leaf 3- (weakly 5-) lobed, <15 cm across. Leaf margin irregular, distantly and coarsely dentate. Fruits a few in short infructescence. **A. sterculiaceum** subsp. **franchetii**

- o Leaf 3-5 (7) lobed, >15 cm across. Leaf margin more regular toothed. Fruits: numerous in long infructescence. **A. sterculiaceum** subsp. **sterculiaceum**
- b Bud **AND** shoot **AND** fruit never stiff- hairy at the same time. 51
- 51 a Leaf unlobed, leaf margin sharply doubly serrate. AND lateral veins >15-20 pairs. **A. carpinifolium** (Indivisa)
- b Leaf different. 52
- 52 a Lamina leathery **AND** fully wintergreen **AND** with pointed apex **AND** unlobed or both unlobed and 3-lobed. Sectio **PENTAPHYLLA, HYPTIOCARPA**. 53
- b Lamina different. Sectio **ACER, GINNALA, PUBESCENTIA, RUBRA, (PENTAPHYLLA)**. 56
- 53 a Lamina abaxially and petiole hairy (fading in Autumn). **A. coriaceifolium** (Pentaphylla/Trifida)
- b Lamina abaxially and petiole glabrous. 54
- 54 a Lamina <10 cm long, ovate to oblong ovate <2 × longer than broad. Juvenile leaf 3-lobed (Leaf margin shallowly toothed at first, entire later). **A. paxii** (Pentaphylla/Trifida)
- b Lamina >10 cm long, oblong ovate 2 × longer than broad. Leaf rarely 3-lobed. 55
- 55 a Lamina adaxially with obvious visible venation, lateral veins >6 pairs. Lamina up to +/- 15 × 5 cm, apex +/- pointed at tip (varieties with smaller leaf, or lamina abaxially green in place of blue-green are sometimes recognised). **A. oblongum** (Pentaphylla/Trifida)
- b Lamina adaxially with less obvious venation, lateral veins ≤6 pairs. Lamina longer and especially broader, up to +/- 18 × 8 cm, apex +/- rounded at tip. **A. laurinum** (Hyptiocarpa)
- 56 a Leaf deeply 3-lobed: terminal lobe finger-shaped (narrow and deep) **AND** ≥3/4 lamina length, (much) longer than lateral lobes (on strong shoots lobes more equal in size).
Sectio **PUBESCENTIA**. **A. pilosum** (Pubescentia)
- b Leaf different (terminal lobe never finger-shaped slender and narrow).
Sectio, **GINNALA** and (**ACER, PENTAPHYLLA, RUBRA**). 57
- 57 a Leaf unlobed to 3-lobed, never 5-lobed, terminal lobe sometimes +/- lobed). 58
- b Leaf 3- to 5- (7-) lobed (5-lobed leaf always present). 66
- 58 a Lamina average <1,5 cm across, leaf margin with sharp, fine +/- prickling teeth. SEE 68b. **A. hyrcanum** subsp. **reginae-amaliae**
- b Lamina different, larger. 59
- 59 a Leaf apex mostly acute to acuminate, **OR IF** always acute, then lateral lobes absent or with apex +/- below the middle of lamina. 60
- b Leaf apex mostly rounded to obtuse, **OR IF** acute, then lateral lobes with apex very obvious above the middle of lamina. 63
- 60 a Leaf margin irregular coarsely serrate-dentate. 61
- b Leaf margin entire **OR** partly entire and shallowly (+/- appressed) serrate. 62
- 61 a Lamina abaxially blue-green, very contrasting with the adaxially green colour.
Sectio (**RUBRA**). **A. pycnanthum** (Rubra)
- b Lamina abaxially green, little or not contrasting with adaxially colour.
Sectio **GINNALA**. **A. tataricum** (Ginnala)
 - Lamina <4 cm long. **A. tataricum** subsp. **semenovii**
 - Lamina >7 cm long.

- Leaf unlobed, or with shallow lobes <1 cm deep, also eventually lobed towards apex. **A. tataricum** subsp. **tataricum**
 - Leaf lobed at base.
 - Lobes blunt at apex. Leaf margin +/- bluntly serrate. **A. tataricum** subsp. **aidzuense**
 - Lobes acute to acuminate at apex. Leaf margin sharply serrate. **A. tataricum** subsp. **ginnala**
- 62 a Lamina at margin partly entire and shallowly (+/- appressed) serrate, abaxially often pale green to blue-green. Sectio (PENTAPHYLLA). A. buergerianum (Pentaphylla/Trifida)**
- Leaf mainly 3-lobed.
 - Lobes directed forward, lamina abaxially pale blue-green. **A. buergerianum** subsp. **buergerianum**
 - Lobes directed sideward, lamina abaxially remarkable blue-green. .. **A. buergerianum** subsp. **ningpoense**
 - Leaf unlobed to (weakly) 3-lobed. **A. buergerianum** subsp. **formosanum**
- b Lamina fully entire at margin, rarely with a blunt-rounded little teeth. Similar but totally unrelated hybrid, features between presumed parents: A. monspessulanum and A. campestre? A. xbornmuelleri (Acer/Monspessulana)**
- 63 a Leaf unlobed AND 3-lobed. 64**
- b Leaf 3-lobed. 65**
- 64 a Leaf semi-wintergreen. Lamina <4 cm, entire at margin (rarely with some shallow little teeth). A. sempervirens (Acer/Monspessulana)**
- b Leaf wintergreen. Lamina ≤6 cm (juvenile >), shallowly toothed at margin (sharply on juvenile, becoming entire on adult). A. obtusifolium (Acer/Monspessulana)**
- 65 a Lateral lobes with apex +/- in or below (never obvious above) the middle of lamia. Terminal lobe longer than broad, rounded to obtuse at apex. . A. monspessulanum (Acer/Monspessulana)**
- Tree or small tree. Samara's green.
 - Lamina average <7 cm, abaxially +/- glabrous, only hairy at base. **A. monspessulanum** subsp. **monspessulanum**
 - Lamina average >7 cm, abaxially densely hairy. **A. monspessulanum** subsp. **ibericum**
 - Dense shrub. Samara's red. Lamina abaxially +/- with rust-coloured hairs. . **A. monspessulanum** subsp. **turcomanicum**
- Different: Shrub to small tree, lamina larger than A. monspessulanum, colour grey-green to yellow-green, Lobes often with more (shallow) teeth. A. pentapomicum (Pubescentia)**
- b Lateral lobes with apex VERY obvious above the middle of lamia. Terminal lobe broader than long, rounded to obtuse (sometimes terminal lobe longer than broad and then apex acute). Similar hybrids, leaf mainly 3-lobed, sometimes some weakly 5-lobed.**
- **Lamina remarkable thick and strong, Features between A. monspessulanum and A. opalus?**
 - Lobes short and more rounded. **A. xcoriaceum** (Acer/Monspessulana)
 - Lobes longer and more pointed. **A. xdurettii** (Acer/Monspessulana)
 - **Lamina not so remarkable thick and strong, extremely similar hybrids, parents presumed.**
 - Features between **A. opalus** and **A. pseudoplatanus**? **A. xhybridum**
 - Features between **A. monspessulanum** and **A. opalus** subsp. **obtusatum**? **A. xrotundilobum**
- 66 a Lamina <9 (11) cm broad and long AND terminal lobe V-shaped, narrower towards base. . 67**
- b Lamina different (OR average broader or longer OR terminal lobe not V-shaped). 68**
- 67 a Mature lamina conspicuously ciliate at margin and abaxially densely hairy even on the smallest veinlets (SEE 69a). A. saccharum subsp. grandidentatum**
- b Mature lamina not ciliate at margin, abaxially glabrous to slightly hairy. A. hyrcanum (Acer/Monspessulana)**
- Shrub, leaf 3-lobed. Lamina 0.5-1.5 cm across. Leaf margin wavy, with sharp, fine +/- prickling teeth. **A. hyrcanum** subsp. **reginae-amaliae**
 - Tree or shrub, leaf 3- to 5-lobed. Lamina 3-10 cm across. Leaf margin flat, never so finely toothed.

- Leaf 3-lobed (at most with very small basal lobes, samara's ≤1 cm)..... **A. hyrcanum** subsp. **sphaerocarpum**
- Leaf 5-lobed (samara's 3-4 cm).
 - Leaf margin with rounded teeth, or +/- crenate.
 - Lamina dull, thin. Terminal lobe with <4 rounded teeth. **A. hyrcanum** subsp. **keckianum**
 - Lamina smooth, thick. Terminal lobe with >5 rounded teeth. **A. hyrcanum** var. **granatense**
 - Leaf margin with blunt to +/- sharp teeth.
 - Lamina abaxially blue-green. **A. hyrcanum** subsp. **intermedium**
 - Lamina abaxially green.
 - Lobes with acute apex and teeth. **A. hyrcanum** subsp. **tauricolum**
 - Lobes with blunt apex and teeth. **A. hyrcanum** subsp. **hyrcanum**

68 a Terminal lobe broad AND with 1-2 (3) +/- sinuous teeth per side. **A. saccharum (Acer/Saccharodendron)**

Extremely variable species, following infraspecific taxa are, among others, recognised:

- Lamina >10 cm long. Lobes obvious long acuminate, slender and pointed at apex.
 - Lamina abaxially yellow-green to green, hairiness stiff. Petiole with stipules at base. **A. saccharum** subsp. **nigrum**
 - Lamina abaxially pale green to blue-green, hairiness different. Petiole without persistent stipules.
 - Lamina abaxially +/- glabrous to softly hairy. Petiole glabrous and slender. **A. saccharum** subsp. **saccharum**
 - Lamina abaxially remarkable densely hairy. Petiole densely hairy and rather thick. **A. saccharum** subsp. **skutchii**
- Lamina average <10 cm long. Lobes blunt to pointed or +/- acuminate at apex.
 - Lamina abaxially green to yellow-green. Lobes +/- acuminate. **A. saccharum** subsp. **leucoderme**
 - Lamina abaxially pale green to blue-green. Lobes blunt to +/- sharp at apex.
 - Teeth blunt. Terminal lobe hardly narrowing towards base. **A. saccharum** subsp. **floridanum**
 - Teeth rounded. Terminal lobe very narrow towards base. **A. saccharum** subsp. **grandidentatum**

b Terminal lobe different (with more teeth per side or remarkable finger-shaped). 69

69 a Terminal lobe triangular, broadest at base AND lobes with conspicuous long acuminate apex. **A. caesium (Acer/Acer)**

- Shoot initially slightly bloomed. Leaf 3- to 5-lobed. **A. caesium** subsp. **caesium**
- Shoot strong bluish-white bloomed (often persistent the 2th year). Leaf (3-) 5- to 7-lobed. ... **A. caesium** subsp. **giraldii**

b Terminal lobe different (if broadest at base than apex not long acuminate). 70

70 a Terminal lobe mostly broader than long AND broadest at base, sinus often broad. Leaf margin +/- shallowly (not sharply) toothed. Lamina often bulged or with wrinkled surface, tending to crack when flattened. See also hybrids. **A. opalus (Acer/Monspessulana)**

- Lamina ≥12 cm broad, +/- thick and leathery. Lobes blunt and rounded. **A. opalus** subsp. **obtusatum**
- Lamina <10 cm broad, thinner. Lobes more pointed. **A. opalus** subsp. **opalus**

Different: some similar hybrids with often 3-lobed leaf, but weakly 5-lobed leaf can be present.

- Lamina remarkable thick and strong. Features between **A. monspessulanum** and **A. opalus**?
 - Lobes short and more rounded. **A. xcoriaceum** (Acer/Monspessulana)
 - Lobes longer, more pointed. **A. xdurettii** (Acer/Monspessulana)
- Lamina not so thick and strong, very similar hybrids, parents disputable.
 - **A. opalus** x **A. pseudoplatanus**? **A. xhybridum** (Acer/Monspessulana)
 - **A. monspessulanum** x **A. opalus** subsp. **obtusatum**? **A. xrotundilobum** (Acer/Monspessulana)

b Terminal lobe different, longer, AND/OR teeth sharper. 71

71 a Terminal bud green, AND well developed >5 mm, AND lateral buds small. **A. pseudoplatanus (Acer/Acer)**

b Terminal bud different (eventually partly green), AND/OR lateral buds obvious larger. 72

- 72 a Lamina remarkably large, 15-30 cm across. Terminal lobe with ≥ 5 blunt to rounded, often very robust teeth per side.** **☐ *A. velutinum* (Acer/Acer)**
- Crown broad to broad dome-shaped. Samara's forming an angle of +/- 90°.
 - o Lamina abaxially green to grey-green, +/- glabrous to densely and pale to rusty-coloured hairy. **☐ *A. velutinum* var. *velutinum***
 - o Lamina abaxially blue-green, completely glabrous. **☐ *A. velutinum* f. *glabrescens***
 - Crown columnar. Lamina abaxially +/- blue-green, hairiness restricted to venation. Samara's forming an angle of >90°. .. **☐ *A. velutinum* var. *vanvolxemii***
- Different:** Plant with features between the parents, hybrid between *A. pseudoplatanus* and *A. velutinum*.
- b Lamina smaller (IF large, then terminal lobe conspicuous V-shaped and/or with sharper teeth).** **73**
- 73 a Terminal lobe +/- V-shaped AND with <6 teeth per side.** **☐ *A. heldreichii* (Acer/Acer)**
- Lobes narrow and very deep. Teeth blunt to rounded. **☐ *A. heldreichii* subsp. *heldreichii***
 - Lobes broad and deep. Teeth blunt to pointed. **☐ *A. heldreichii* subsp. *trautvetteri***
- Different:** Leaf with features between *A. pseudoplatanus* and *A. heldreichii*. **☐ *A. x pseudoheldreichii***
- b Terminal lobe different (IF V-shaped then teeth more numerous and sharp).** **74**
- 74 a Leaf 5-lobed, terminal lobe conspicuous narrowed at base, basal lobes obvious. Leaf margin with sharply pointed teeth.** **☐ *A. saccharinum* (Rubra)**
- Different:** Terminal lobe variable narrow to broad at base and leaf margin with +/- blunt teeth, intermediar between the parents *A. rubrum* and *A. saccharinum*. **☐ *A. x freemannii* (Rubra)**
- b Leaf 3- to 5-lobed, terminal lobe not narrowed at base, basal lobes less obvious or lacking. Leaf margin with +/- blunt pointed teeth.** **☐ *A. rubrum* (Rubra)**
- 75 a Leaf base round to +/- cordate. Basal lateral veins ending high in the leaf margin: between 1/3 and 1/2 lamina length. Lamina abaxially +/- paler green to blue-green than abaxial surface.** **☐ *A. cordatum* (Palmata/Penninervia)**
- b Leaf base cuneate to rounded. Basal lateral veins ending low in the leaf margin: under 1/3 lamina length. Lamina abaxially and adaxially +/- concolorous, green.** **76**
- 76 a Lamina >10 cm long. Venation reticulate (both surfaces). Leaf margin +/- undulate.** **☐ *A. laevigatum* (Palmata/Penninervia)**
- b Lamina <10 cm long. Venation not reticulate. Leaf margin +/- flat.** **☐ *A. fabri* (Palmata/Penninervia)**
- 77 a Lamina abaxially remarkable "cobweb-like" hairy (surface seems covered with a cobweb). Leaf 5- to 7-lobed.** **☐ *A. erianthum* (Palmata/Sinensia)**
- b Lamina abaxially different.** **78**
- 78 a Leaf 3-lobed, OR unlobed and 3-lobed.** **79**
- b Leaf 3-5 lobed OR more.** **80**
- 79 a Leaf 3-lobed, ≤ 10 cm long. Lobes slender and finger-shaped, with finely serrated margin. Terminal lobe >4/5 lamina length. Petiole 3-5 cm, long + thin compared with lamina length.**
- Lobes apical conspicuous >2 cm long, line-caudate. Lamina abaxially rusty-hairy in vein axils. **☐ *A. wardii* (Wardiana)**
 - Lobes apical not as long caudate. Lamina abaxially glabrous. **☐ *A. tutcheri* (Palmata/Sinensia)**
- b Leaf 3-lobed (rarely unlobed, or 5-lobed and juvenile), 10-25 cm long. Lobes and margin different. Petiole 2-4 cm, short and thick compared with lamina length.**
- Leaf unlobed to 3-lobed, 10-25 cm. Terminal lobe caudate and lateral lobes acute to +/- caudate at apex. Leaf margin initially coarsely serrate, entire later. **☐ *A. calcaratum* (Palmata/Sinensia)**
 - Leaf 3-lobed (juvenile 5-lobed), 10-15 cm long. Lobes bluntly pointed to long acuminate. Leaf margin coarsely dentate, entire later (several subspecies are recognised)..... **☐ *A. tonkinense* (Palmata/Sinensia)**

- 80 a Leaf 3- to 5-lobed; OR 5-lobed AND average <10 cm across. 81
- b Leaf 5- to 7-lobed or more-lobed; OR 5-lobed AND average >10 cm across. 83
- 81 a Leaf 3- to 5-lobed, basal lobes very small, <1 cm. Lobes oblong to broad ovate, entire to +/- fine-sharply serrated towards apex. Leaf base cuneate to +/- rounded.
..... **A. campbellii** subsp. **wilsonii** (Palmata/Sinensia)
- b Leaf 5-lobed, basal lobes >1 cm (sometimes 3- and/or 4-lobed leaf present). Lobes (elongate) triangular, gradually tapered, fully serrate at margin. Leaf base truncate to weakly cordate. 82
- 82 a Terminal lobe 2/3 to 3/4 lamina length. **A. oliverianum** (Palmata/Sinensia)
- Lamina abaxially hairy in vein axils and +/- along veins. **A. oliverianum** subsp. **oliverianum**
 - Lamina abaxially glabrous, often with purplish hue (**A. serrulatum** in FOC). **A. oliverianum** subsp. **formosanum**
- b Terminal lobe 1/2 lamina length.
- Petiole felt-like hairy. Lamina not leathery, abaxially green (**A. pubinerve** in FOC). **A. wuyuanense** (Palmata/Sinensia)
 - Petiole glabrous.
 - o Lamina +/- thick, often +/- leathery and smooth waxy to the touch. Leaf base cordate to deeply cordate (**A. sinense** in FOC). **A. campbellii** subsp. **sinense** (Palmata/Sinensia)
 - o Lamina not so thick nor leathery. Leaf base truncate to weakly cordate (looks like a large-leaved **A. oliverianum** and synonymous in FOC). **A. schneiderianum** (Palmata/Sinensia)
- 83 a Emerging leaf often remarkable reddish-brown, AND lobes finger-shaped >3/4 lamina length, margin coarsely dentate. Mature leaf on older plant is less deeply lobed and less coarsely dentate to very finely serrate (lobes 5, 5-7 sometimes 7-9). (Sectio **PALMATA/Sinensia**). ... 84
- b Emerging leaf not so remarkable reddish-brown, not deeper finger-shape-lobed and not more coarsely dentate than mature leaf, but similar and only smaller (lobes 5-7 or more). (Sectio **PALMATA/Palmata**) 85
- 84 a Leaf variable 5- to 7-lobed (sometimes weakly 9-lobed). **A. campbellii** (Palmata/Sinensia)
- Lobes narrow to broad and leaf margin very finely serrate. **A. campbellii** subsp. **campbellii**
 - Lobes narrow and leaf margin irregular sharply serrate (**A. flabellatum** in FOC). **A. campbellii** subsp. **flabellatum**
- b Leaf 5-lobed.
- Lamina +/- leathery, abaxially pale green to blue-green. Petiole stout. (**A. sinense** in FOC, forms with large leaf and long lobes as well as with smaller leaf and short lobes). **A. campbellii** subsp. **sinense**
 - Lamina not leathery. Lamina abaxially green. Petiole slender. **A. elegantulum** (Palmata/Sinensia)
- 85 a Terminal lobe $\geq 1/2$ - $1/3$ lamina length. 86
- b Terminal lobe <1/2 lamina length. 89
- 86 a Petiole AND annual shoot lasting and densely covered with adpressed, short and stiff hairs. Lamina abaxially initially +/- greyish by similar kind of hairs. Leaf 5- to 7-lobed, resembling a dull-green coloured **A. palmatum**. **A. pubipalmatum** (Palmata/Palmata)
- b Petiole AND shoot not so densely nor lasting hairy. Lamina abaxially different IF leaf is 5- to 7-lobed. OR leaf 7- to more-lobed. 87
- 87 a Leaf with 5-7 (sometimes 9-) lobes, long and slender +/- caudate (hybrids between the infraspecific taxa and with other related taxa like **A. shirasawanum**, **A. sieboldianum** and **A. pseudosieboldianum** occur!).....
..... **A. palmatum** (Palmata/Palmata)
- Leaf margin finely serrate. Terminal lobe 1/2-1/3 lamina length. **A. palmatum** subsp. **amoenum**
 - Leaf margin coarsely serrate. Terminal lobe >2/3-3/4 lamina length.
 - o Lobes 5-7, terminal lobe 2/3-3/4 lamina length. **A. palmatum** subsp. **palmatum**
 - o Lobes 7 (-9), terminal lobe >3/4 lamina length. **A. palmatum** subsp. **matsumurae**
- b Leaf with (7) 9-11 (13) lobes, gradually tapered to a point, not caudate. 88

- 88 a Leaf base +/- truncate to somewhat cordate. **A. tenuifolium** (Palmata/Palmata)
- b Leaf base deeply cordate. **A. pseudosieboldianum** (Palmata/Palmata)
- Lobes 9-11. **A. pseudosieboldianum** subsp. **pseudosieboldianum**
- Lobes 9-13. **A. pseudosieboldianum** subsp. **takesimensense**
- 89 a Lobes 5-7 (rarely 5-9). Leaf margin sharply double serrate with teeth up to 1 mm.
..... **A. duplicatoserratum** (Palmata/Palmata)
- b Lobes 7-11 (13) (no leaf with 5 lobes present). Leaf margin not so finely serrate. 90
- 90 a Lobes 7 (9), slender caudate. **A. robustum** (Palmata/Palmata)
- b Lobes 7-9 or more, never slender caudate. 91
- 91 a Lamina <8 cm long. Lobes 9 (sometimes 7-11). **A. sieboldianum** (Palmata/Palmata)
- b Lamina >8 cm long. Lobes 7-9 or more. 92
- 92 a Lobes 7-9. Shoot greenish and lasting so the 2nd and 3th year. **A. circinatum** (Palmata/Palmata)
- b Lobes 9-11 (13). Shoot initially green, becoming grey to brown the 2nd year. 93
- 93 a Lobes 9-11. Lamina abaxially +/- dull. Petiole thick and often <1/2 lamina length (hybrids occur frequently, among others with **A. circinatum** and **A. pseudosieboldianum**).
..... **A. japonicum** (Palmata/Palmata)
- b Lobes 9-13. Lamina abaxially shiny. Petiole thin and >1/2 lamina length.
..... **A. shirasawanum** (Palmata/Palmata)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	cm	
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