Fabaceae (pro parte)

Acacia Mill.
Albizia Durazz.
Biancaea Tod.
Ceratonia L.
Cercis L.
Cladrastis Raf.
Erythrostemon Klotzsch
Gleditsia L.
Gymnocladus Lam.
+***Laburnocytisus*** C.K.Schneid.
Laburnum Fabr.
Maackia Rupr.
Paraserianthes I.C.Nielsen
Platyosprion Maxim.
Robinia L.
Sophora L.
Styphnolobium Schott
Tipuana Benth.
Vachellia Wight & Arn.

VEGETATIVE KEY TO ARBORESCENT SPECIES CULTIVATED IN WESTERN EUROPE

Jan De Langhe

(31 August 2011 - 2 October 2023)

Vegetative identification key.

Introduction:

The taxa discussed here are arborescent (in a few cases exceptions are made to complement an otherwise arborescent genus). The ***Albizia***, ***Biancaea***, ***Erythrostemon***, ***Tipuana*** and selected ***Acacia*** taxa proved to be hardy since several decades in the Mediterranean region and more and more also beyond. It are popular container plants, often cultivated under glass.

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

- Use a 10× hand lens to check pubescence and venation pattern in general.
- Look at the entire plant. Young specimens, shade, and strong shoots give an atypical view, so avoid them!
- Beware of hybridisation, especially with plants raised from seed other than wild origin.

Abbreviations and glossary for this key:

LS → lower surface
L/W ratio → length/width ratio
US → upper surface

jugary gland → gland on the rachis of a pinnate leaf near the attachment of pinnae (jugary extra-floral nectary)
phyllode → modified petiole, with the appearance and function of a leaf
pinna (pinnae) → primary segment(s) of a bipinnate leaf
pulvinus → enlarged/thickened basal part of a petiole
stipel (stipels) → stipule(s) of a leaflet
stipule (stipules) → leaflike structure(s) at the base of a leaf or its petiole
stipular spine → sharp-pointed stipule

Taxa treated in this key: → p9.

Taxa referred to synonymy in this key: → p9.

References:

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

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Plantentuin Universiteit Gent

Arboretum Wespelaar

KEY TO GROUPS

01 a Foliage with simple leaves, OR with phyllodes (in the case of the latter sometimes juvenile bipinnate leaves may occur in part of the foliage**).** **02**

b Foliage with all leaves compound (trifoliolate, pinnate or bipinnate**).** **03**

02 a Foliage with simple leaves.
Group A1: ***Cercis*.** ..... **→page 3**

b Foliage with phyllodes.
Group A2: ***Acacia*** **(**pro parte**).** ..... **→page 4**

03 a Leaves trifoliolate.
Group B1: +***Laburnocytisus***, ***Laburnum*.** ..... **→page 5**

b Leaves pinnate AND/OR bipinnate. **04**

04 a Leaflet margin (sometimes minutely!**) crenulate (**10× LENS, examine several leaves**).**
Group B2: ***Gleditsia*.** ..... **→page 5**

b Leaflet margin entire. **05**

05 a Leaves bipinnate.
Group B3: ***Acacia*** **(**pro parte**)**, ***Albizia***, ***Biancaea***, ***Erythrostemon***, ***Gymnocladus***, ***Paraserianthes***, ***Vachellia*.** ..... **→page 6**

b Leaves pinnate. **06**

06 a Lateral buds concealed by leaf pulvini.
Group B4: ***Cladrastis***, ***Platyosprion***, ***Robinia***, ***Styphnolobium*.** ..... **→page 7**

b Lateral buds visible.
Group B5: ***Ceratonia***, ***Maackia***, ***Sophora***, ***Tipuana*.** ..... **→page 8**

GROUP A1:
Foliage with simple leaves.

01 a Lamina apex predominantly obtuse AND/OR emarginate. **02**

b Lamina apex predominantly acute to acuminate. **05**

02 a Juvenile branchlet, petiole and lamina lower surface venation pubescent (10× LENS**).** ..... ***Cercis canadensis*** var. ***mexicana***

b Juvenile branchlet, petiole and lamina lower surface glabrous (except vein axils**).** **03**

03 a Lamina predominantly reniform. ..... ***Cercis griffithii***

b Lamina orbicular, OR orbicular to reniform. **04**

04 a Tree. Lamina texture thin/papery. ..... ***Cercis siliquastrum***

b Spreading multi-stemmed shrub, rarely small tree. Lamina texture thick, +/- leathery. ..... ***Cercis occidentalis***

05 a Large (>1 cm) persisting stipules evident. ..... ***Cercis chingii***

b Stipules caducous. **06**

06 a Lamina LS minutely to densely pubescent all over (10× LENS**).** **07**

b Leaflet LS (soon**) glabrous, OR with minute pubescence restricted to veins/vein axils.** ...**10**

07 a Lamina margin undulate. ..... ***Cercis canadensis*** var. ***mexicana***

b Lamina margin flat. **08**

08 a Lamina LS basal veins 7-9. ..... ***Cercis canadensis*** subsp. ***texensis***

b Lamina LS basal veins 5-7. ..... **09**

09 a Lamina apex with acute acumen (10× LENS**).** ..... ***Cercis racemosa***

b Lamina apex with blunt acumen. ..... ***Cercis yunnanensis***

10 a Lamina inequilateral, base obliquely cuneate; LS basal veins 3-5. ..... ***Cercis chuniana***

b Lamina equilateral, base (sub-**)truncate to (**deeply**) cordate; LS basal veins 5-7(-9).** **11**

11 a Lamina LS basal veins 7-9. ..... ***Cercis canadensis***

b Lamina LS basal veins 5-7, OR 7. ..... **12**

12 a Lamina LS basal veins 5-7. ..... ***Cercis glabra***

b Lamina LS basal veins predominantly 7. ..... **13**

13 a Lamina LS basal vein axils predominantly minutely pubescent (10× LENS, examine several leaves**).** ..... ***Cercis chinensis***

b Lamina LS basal vein axils predominantly glabrous. ..... ***"Cercis gigantea"***

GROUP A2:
Foliage with phyllodes (sometimes juvenile bipinnate leaves may occur in part of the foliage**).**

01 a Phyllode L/W ratio predominantly <4/1. ..... **02**

b Phyllode L/W ratio >4/1. ..... **08**

02 a Phyllode length <3 cm, AND/OR +/- triangular or obtriangular. **03**

b Phyllode length 4-10(-more**) cm, elliptic to obovate.** **04**

03 a Phyllode largest width clearly above the middle. ..... ***Acacia pravissima***

b Phyllode largest width in or below the middle. ..... ***Acacia cultriformis***

04 a Shoot, at least initially pubescent (10× LENS**).** ..... ***Acacia podalyriifolia***

b Shoot glabrous. **05**

05 a Phyllode with 2-4 major longitudinal veins. ..... ***Acacia longifolia*** subsp. ***sophorae***

b Phyllode with 1 longitudinal vein. **06**

06 a Phyllode length 2-6 cm. ..... ***Acacia pataczekii***

b Phyllode length 5-10(-more**) cm.** **07**

07 a Midvein eccentric. ..... ***Acacia obliquinervia***

b Midvein +/- central. ..... ***Acacia pycnantha***

08 a Phyllode with 1 longitudinal vein. **09**

b Phyllode with 2-4(-more**) longitudinal veins.** **13**

09 a Phyllode with 2-3 glands along margin (10× LENS**).** ..... ***Acacia dodonaeifolia***

b Phyllode with 1 gland, usually at/near base. **10**

10 a Bipinnate leaves often persist. ..... ***Acacia rubida***

b Bipinnate leaves usually absent. **11**

11 a Phyllode 10-25 cm long, basal gland prominent: flat and large (10× LENS**).** ***Acacia saligna***

b Phyllode 6-16 cm long, basal gland not prominent/indiscernible. **12**

12 a Branchlet pruinose. Phyllode oblong elliptic, length <6 cm. ..... ***Acacia covenyi***

b Branchlet not pruinose. Phyllode oblanceolate, length 6-15 cm. ..... ***Acacia retinodes***

13 a Bipinnate leaves often persist. ..... ***Acacia melanoxylon***

b Bipinnate leaves usually absent. **14**

14 a Phyllode with 2-3 longitudinal veins. **15**

b Phyllode with 3-4(-more**) longitudinal veins.** **16**

15 a Phyllode 5-20 cm, with apex soft. ..... ***Acacia longifolia***

b Phyllode 1-5 cm, with apex pungent. ..... ***Acacia riceana***

16 a Full grown phyllode green. **17**

b Full grown phyllode grey-green or (sub-)glaucous. **18**

17 a Phyllode length 5-8 cm, width 2-5 mm. ..... ***Acacia mucronata***

b Phyllode length 10-20 cm, width 6-25(-35**) mm.** ..... ***Acacia maidenii***

18 a Phyllode length 4-12 cm, width 1-4 mm. ..... ***Acacia aneura***

b Phyllode length 14-40 cm, width 2-7 mm. ..... ***Acacia stenophylla***

GROUP B1:
Leaves trifoliolate.

01 a <u>Terminal</u> leaflet, <u>in part of the foliage</u>, small: midvein length ≤2 cm, <u>AND</u> longer than petiole (examine the whole plant**).** ..... +***Laburnocytisus* 'Adamii'**

b <u>Terminal</u> leaflet midvein length clearly >2 cm, <u>AND</u> shorter than petiole. **02**

02 a Long shoot completely pubescent with +/- appressed short hairs (10× LENS**).**
..... ***Laburnum anagyroides***

b Long shoot (soon**) glabrous, <u>OR</u> with scattered long hairs, <u>OR</u> variable (**glabrous to pubescent in various parts of the foliage**).** **03**

03 a Leaflet LS predominantly with scattered, long loose hairs along midvein (10 × LENS**).**
..... ***Laburnum alpinum***

b Leaflet LS predominantly equally pubescent with +/- appressed short hairs, sometimes intermixed with long hairs. ..... ***Laburnum* ×*watereri***

GROUP B2:
Leaves pinnate <u>AND/OR</u> bipinnate.
Leaflet margin (sometimes minutely!**) crenulate (**10× LENS**).**

01 a Leaves always pinnate (examine the whole foliage**).** **02**

b Leaves pinnate <u>AND</u> bipinnate. **04**

02 a Petiolule ≤1 mm. Leaflet rhombic. ..... ***Gleditsia fera***

b Petiolule 1-5 mm. Leaflets ovate or ovate-lanceolate to oblong. **03**

03 a Leaflets 3-6 pairs. ..... ***Gleditsia macracantha***

b Leaflets 4-8 pairs. ..... ***Gleditsia sinensis***

04 a Leaflet margin vaguely crenulate, appears entire at least in part of the foliage. Secondary veins rather anastomosing before reaching margin (10× LENS**).** ..... ***Gleditsia japonica***

b Leaflet margin clearly crenulate with several secondary vein forks reaching margin. ... **05**

05 a Leaflet LS midvein glabrous (10× LENS**).** ..... ***Gleditsia aquatica***

b Leaflet LS midvein pubescent. **06**

06 a Pinnae 4-7 pairs. Spines simple or trifid. ..... ***Gleditsia triacanthos***

b Pinnae 3-4 pairs. Spines trifid to multi-forked. ..... ***Gleditsia caspica***

GROUP B3:
Leaves bipinnate (Leaflet margin entire).

01 a Upper pairs of pinnae with 4-7 pairs of ovate leaflets, AND the lower pairs are simple leaflets. ..... ***Gymnocladus dioicus***

b All pinnae with several pairs of leaflets, simple leaflets absent. **02**

02 a Rachis armed with scattered decurved prickles. ..... ***Biancaea decapetala***

b Rachis without decurved prickles. **03**

03 a Pinnae in 1-6(-15) pairs + 1 terminal pinna (sometimes lacking). ... ***Erythrostemon gilliesii***

b Pinnae in pairs. **04**

04 a Plant deciduous. **05**

b Plant evergreen (semi-evergreen in colder area**).** **06**

05 a Pinnae in 4-12 pairs. Leaflet 8-12 mm. ..... ***Albizia julibrissin***

b Pinnae in 3-6 pairs. Leaflet 15-40 mm. ..... ***Albizia kalkora***

06 a Branchlets clearly armed with stipular spines. Leaves often in fascicles. **07**

b Stipular spines absent. Leaves alternate. **08**

07 a Stipular spines up to 2-3 cm. Branchlets minutely pubescent (10× LENS**).** ***Vachellia caven***

b Stipular spines up to 5-12(-more**) cm. Branchlets glabrous.** ..... ***Vachellia karroo***

08 a Phyllodes quite often present. ..... ***Acacia melanoxylon***

b Phyllodes absent. **09**

09 a Jugary gland and opening, at base of pinnae usually absent/indiscernible (10× LENS**).** .**10**

b Jugary gland and opening, at base of several pinnae often prominent. **11**

10 a Leaf small: 5 cm × 2,5 cm, petiole <1 cm. ..... ***Acacia cardiophylla***

b Leaf large: 10-20(-more) cm, petiole 3-8 cm. ..... ***Paraserianthes lophantha***

11 a Pinnae in 2-4 pairs. ..... ***Acacia baileyana***

b Pinnae in 6-20(-more**) pairs.** **12**

12 a Emerging foliage glabrescent or with whitish-grey pubescence (10× LENS**).** **13**

b Emerging foliage with golden-yellow pubescence. **14**

13 a Young shoots, rachis and leaves +/- minutely silvery-glaucous pubescent (10× LENS**), Pinnae closely spaced/touching.** ..... ***Acacia dealbata***

b Young shoots, rachis and leaves glabrous to puberulous. Pinnae widely spaced. ..... ***Acacia decurrens***

14 a Jugary gland at base of each pair of pinnae (10× LENS**).** ..... ***Acacia parramattensis***

b Jugary gland often absent in part of the pinnae. ..... ***Acacia irrorata***

GROUP B4:
Leaves pinnate (Leaflet margin entire).
Lateral buds concealed by leaf pulvini.

01 a Leaflet apex gradually acuminate, or acute to emarginate, <u>BUT</u> apiculus or bristle absent (10× LENS**).** **02**

b Leaflet apex acute to emarginate <u>AND</u> apiculate to +/- bristly. **04**

02 a Leaflet apex gradually acuminate. Terminal leaflet with 2 stipels, lateral leaflet with 1 stipel (10× LENS**).** ..... ***Platyosprion platycarpum***

b Leaflet apex emarginate or acute. Leaflets without stipels. **03**

03 a Leaflets 9-13, closely set; +/- <u>uniformly</u> ovate oblong, <u>AND</u> apically +/- emarginate (10× LENS**).** ..... ***Cladrastis delavayi***

b Leaflets 5-11, distantly set; <u>variable</u> from elliptic to obovate or ovate (often on the same leaf!**), <u>AND</u> apically acute.** ..... ***Cladrastis kentukea***

04 a Branchlets vivid green, <u>AND</u> green to olive-green for several successive years. **05**

b Branchlets often brownish to reddish, <u>AND</u> woody the second year. **06**

05 a Leaflets 9-15, ovate to elliptic. ..... ***Styphnolobium japonicum***

b Leaflets 13-19, elliptic. ..... ***Styphnolobium affine***

06 a Leaflets 7-13(-15**), <u>AND</u> shoot +/- bristly pubescent to the naked eye.** ..... ***Robinia hispida***

b Leaflets 13-23. Shoot viscous and warty glandular, <u>OR</u> glabrous to slightly pubescent (except inflorescence!). **07**

07 a Shoot conspicuously viscous and warty glandular (10× LENS**).** ..... ***Robinia viscosa***

b Shoot not warty glandular. **08**

08 a Leaflet apically predominantly rounded and +/- emarginate. ..... ***Robinia pseudoacacia***

b Leaflet apically predominantly (sub-)acute. ..... ***Robinia neomexicana***

GROUP B5:
Leaves pinnate (Leaflet margin entire).
Lateral buds visible.

01 a Largest leaflet midvein length >3 cm. **02**

b Largest leaflet midvein length <3 cm. **08**

02 a Leaflet apex rounded to emarginate. **03**

b Leaflet apex acute. **04**

03 a Leaflets 4-10(-12**).** ..... ***Ceratonia siliqua***

b Leaflets 12(13**)-24(**25**).** ..... ***Tipuana tipu***

04 a Leaflets 19-25. ..... ***Sophora flavescens***

b Leaflets 7-15(-17). **05**

05 a Leaflets 7-11. ..... **06**

b Leaflets 9-13, OR 9-15(-17). **07**

06 a Leaflet LS glabrous to glabrescent (10× LENS**).** ..... ***Maackia amurensis***

b Leaflet LS pubescent. ..... ***Maackia buergeri***

07 a Leaflets 9-13. ..... ***Maackia hupehensis***

b Leaflets 9-15(-17). ..... ***Maackia floribunda***

08 a Leaflets 7-25. ..... **09**

b Leaflets 25-51(-more**), at least so in part of the foliage.** **13**

09 a Larger leaf length <10 cm. **10**

b Larger leaf length >10 cm. **11**

10 a Leaf length <3 cm. ..... ***Sophora prostrata***

b Leaf length 3-8 cm. ..... ***Sophora toromiro***

11 a Leaflet US glabrous or slightly pubescent in part (10× LENS**).** ..... ***Sophora howinsula***

b Leaflet US clearly appressed pubescent. **12**

12 a Leaflet margin clearly revolute (10× LENS**).** ..... ***Sophora macrocarpa***

b Leaflet margin rather flat. ..... ***Sophora tetraptera***

13 a Leaflet sessile, petiolule +/- absent/indiscernible (10× LENS**).** ..... ***Sophora fulvida***

b Leaflet with petiolule evident. **14**

14 a Leaflets all distant. **15**

b Leaflets closely set and (slightly) overlapping in part of the leaf. **16**

15 a Leaflet largest width clearly above the middle. ..... ***Sophora longicarinata***

b Leaflet largest width in the middle. ..... ***Sophora microphylla***

16 a Leaflets rather overlapping in leaf apical part. ..... ***Sophora cassioides***

b Leaflets rather overlapping in leaf basal part. ..... ***Sophora chathamica***

Taxa treated in this key.

Acacia aneura
Acacia baileyana
Acacia cardiophylla
Acacia covenyi
Acacia cultriformis
Acacia dealbata
Acacia decurrens
Acacia dodonaeifolia
Acacia irrorata
Acacia longifolia
-*subsp.* ***sophorae***
Acacia maidenii
Acacia melanoxylon
Acacia mucronata
Acacia obliquinervia
Acacia parramattensis
Acacia pataczekii
Acacia podalyriifolia
Acacia pravissima
Acacia pycnantha
Acacia retinodes
Acacia riceana
Acacia rubida
Acacia saligna
Acacia stenophylla

Albizia julibrissin
Albizia kalkora

Biancaea decapetala

Ceratonia siliqua

Cercis canadensis
-var. ***mexicana***
-subsp. ***texensis***
Cercis chinensis
Cercis chingii
Cercis chuniana
"Cercis gigantea"
Cercis glabra
Cercis griffithii
Cercis occidentalis
Cercis racemosa
Cercis siliquastrum
Cercis yunnanensis

Cladrastis kentukea
Cladrastis delavayi

Erythrostemon gilliesii

Gleditsia aquatica
Gleditsia caspica
Gleditsia fera
Gleditsia japonica
Gleditsia macracantha
Gleditsia sinensis
Gleditsia triacanthos

Gymnocladus dioicus

+***Laburnocytisus*** **'Adamii'**
(Laburnum anagyroides + Cytisus purpureus)

Laburnum alpinum
Laburnum anagyroides
Laburnum ×watereri **(**L.alpinum × L.anagyroides**)**

Maackia amurensis
Maackia buergeri
Maackia floribunda
Maackia hupehensis

Paraserianthes lophantha

Platyosprion platycarpum

Robinia hispida
Robinia neomexicana
Robinia pseudoacacia
Robinia viscosa

Sophora cassioides
Sophora chathamica
Sophora flavescens
Sophora fulvida
Sophora howinsula
Sophora longicarinata
Sophora macrocarpa
Sophora microphylla
Sophora prostrata
Sophora tetraptera
Sophora toromiro

Styphnolobium affine
Styphnolobium japonicum

Tipuana tipu

Vachellia caven
Vachellia karroo

Taxa referred to synonymy in this key (fide Plants of the World Online: POWO).

Acacia caven → ***Vachellia caven***
Acacia karroo → ***Vachellia karroo***
Albizia lophantha → ***Paraserianthes lophantha***
Caesalpinia decapetala → ***Biancaea decapetala***
Caesalpinia gilliesii → ***Erythrostemon gilliesii***
Caesalpinia japonica → ***Biancaea decapetala***
Cercis reniformis → ***Cercis canadensis*** subsp. ***texensis***
Cladrastis platycarpa → ***Platyosprion platycarpum***
Cladrastis sinensis → ***Cladrastis delavayi***
Gleditsia ferox → ***Gleditsia triacanthos***
Gleditsia macracantha ~ ***Gleditsia sinensis***
Gleditsia rolfei auct. → ***Gleditsia fera***
Gymnocladus dioica → ***Gymnocladus dioicus*** (genus masculum conservandum)
Sophora affine → ***Styphnolobium affine***
Sophora japonica → ***Styphnolobium japonicum***