



An interactive guide to the woody plants of the Majella National Park (C Italy)

(printable field version)

**Giampiero Ciaschetti, Pier Luigi Nimis, Stefano Martellos, Luciano Di Martino,
Mirella Di Cecco, Maria Peroni, Teodoro Andrisano**

Foto di Andrea Moro









This is the English version of a guide to the woody plants of the Majella National Park in Central Italy, our answer to a common question from visitors: "How can we know the names of the myriad of plants we see when hiking, camping, or just observing nature?"









The identification of plants is often a matter for experts, because most of the "professional" identification keys rely on the hierarchical scheme of biological classification. One has to start with a key to families, go on with a key to genera within a family, and finally proceed with a key to species within a genus. But the characters that distinguish families or genera are often "difficult", many of them can be appreciated with a stereomicroscope.




Our guide is based on easily observable characters, illustrated by pictures and/or drawings created by Andrea Moro. It can be used by persons which approach the identification of plants for the first time.







Our guide is "easy", but is made with scientific rigour. It includes all species and subspecies of woody plants (trees, shrubs, and woody climbers), which occur in the wild, plus some of the most common alien plants used for reforestation. The Italian version has a taxon page for each species, reporting common names, synonyms, morphology, distribution, ecology and uses in the local tradition. The English version is still devoid of this info.








The guide was created in collaboration with the European project KeyToNature (www.keytonature.eu), coordinated by the Department of Life Sciences of the University of Trieste (www.dryades.eu), with support from the Abruzzo Region (Regional Law 35/97 for "Protection of plant biodiversity and management of gardens and botanical gardens").









1	Plants attached to the branches and trunks of trees and shrubs		2
1	Plants rooting in soil		3
2	Leaves deciduous, indistinctly pinnately-veined. All flowers with a calyx. Fruit yellow		Loranthus europaeus Jacq.
2	Leaves evergreen, with 5(-7) obvious parallel veins. Male flowers without calyx. Fruit white		Viscum album L. subsp. album
3	Plants with thick, fleshy stems (Opuntia)		Opuntia ficus-indica (L.) Mill.
3	Plants with woody stems		4
4	Plants without well-developed leaves (leaves reduced to yellowish scales or substituted by green stems)		5
4	Plants with well-developed leaves		8
5	Stems jointed, with a small sheath at the base of each joint		Ephedra nebrodensis Guss. subsp. nebrodensis







5	Stems not jointed, in part transformed into structures similar to leaves (cladodes)		6
6	Cladodes needle-like, <4 mm wide		Asparagus acutifolius L.
6	Cladodes flattened, >4 mm wide		7
7	Cladodes 5-10 cm long, not ending with a spine		Ruscus hypoglossum L.
7	Cladodes 1.5-4 cm long, ending with a spine		Ruscus aculeatus L.
8	Leaves needle- or scale-like		9
8	Leaves neither needle- nor scale-like		33
9	Leaves scale-like, < 8 mm long, adpressed to branches		10
9	Leaves needle-like, >8 mm long, diverging from branches		16






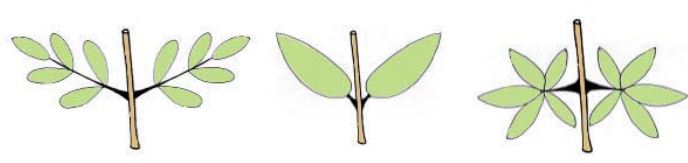
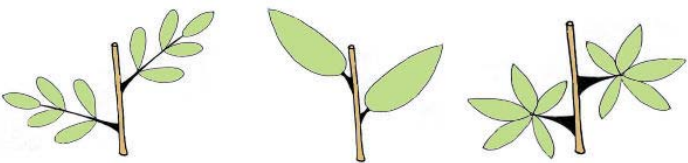
10	Flowers hermaphrodite, with petals (Angiosperms)		11
10	Flowers unisexual, without petals (Gymnosperms)		12
11	Leaves lanceolate. Stamens 10, the filaments fused near the base		Myricaria germanica (L.) Desv.
11	Leaves triangular. Stamens 5, the filaments free		Tamarix africana Poir.
12	Stems prostrate. Cones leathery		Juniperus sabina L.
12	Stems erect. Cones woody		13
13	Branchlets strongly flattened, arranged in vertical sprays. Cones much longer than wide, the scales with a terminal hook		Thuja orientalis L.
13	Branchlets not flattened, spreading in all directions. Cones subglobose, the scales with a central umbo		14









14	Leaves blue-green		Cupressus arizonica Greene
14	Leaves green		15
15	Crown columnar. Leaves 0.5-1 mm long, the apex not curved. Shoots smooth, scarcely resinously aromatic		Cupressus sempervirens L.
15	Crown pyramidal. Leaves 1-2 mm long, the apex slightly curved. Shoots roughened by the rounded leaf tips, sweetly aromatic when crushed		Cupressus macrocarpa Hartw.
16	Leaves opposite, with a strong smell of rosemary		Rosmarinus officinalis L.
16	Leaves not opposite, not smelling of rosemary		17
17	Stem for the greatest part green. Flowers with petals		Asparagus acutifolius L.
17	Stem brown to grey. Flowers without petals		18
18	Leaves with 1-2 paler bands on the upper surface		19
18	Leaves without paler bands on upper surface		22









19	Leaves with a single pale band above. Fruits aromatic, blue-frosted, usually <7 mm wide		20
19	Leaves with 2 pale bands above. Fruits insipid, brownish, >7 mm wide		21
20	Stems erect		Juniperus communis L. var. communis
20	Stems prostrate		Juniperus communis L. var. saxatilis Pall.
21	Leaves to 2 mm wide. Fruit brownish-red, shiny, 7-11 mm wide		Juniperus oxycedrus L. subsp. oxycedrus
21	Leaves to 2.5 mm wide. Fruit brown, dull, 8-15 mm wide		Juniperus oxycedrus L. subsp. macrocarpa (Sibth. & Sm.) Neilr.
22	Leaves flattened		23
22	Leaves not flattened		25








23	Leaves evenly spread around the branches		Abies cephalonica Loudon
23	Leaves arranged in 2 opposite ranks along the branches		24
24	Leaves uniformly coloured beneath. With a single seed surrounded by a fleshy red cup		Taxus baccata L.
24	Leaves with 2 obvious paler bands beneath. With several seeds gathered in woody cones		Abies alba Mill.
25	Leaves borne singly, evenly spread on the branches		Picea abies (L.) H. Karst.
25	Leaves arranged in bundles of 2, or crowded on small lateral branches		26
26	Leaves borne singly, crowded on small lateral branches		27
26	Leaves arranged in bundles of 2		29








27	Leaves deciduous. Cones <4 cm wide		Larix decidua Mill.
27	Leaves evergreen. Cones >4 cm wide		28
28	Leaves 3-5 cm long. Young twigs soft and pendulous, densely dark-downy		Cedrus deodara (Rosb. ex D. Don) G. Don
28	Leaves to 3 cm long (rarely more). Young twigs rigid, not pendulous, glabrous or pale-downy		Cedrus atlantica (Endl.) Carrière
29	Shrub branching from the base, without a distinct main trunk, usually <4 m tall		Pinus mugo Turra subsp. mugo
29	Trees with a distinct main trunk, branching well above ground level, >4 m tall		30
30	Leaves in average <6.5 cm long (measure at least 10 leaves!)		31
30	Leaves in average >6.5 cm long		32







31	Leaf-sheaths thick and brown throughout. Leaves 0.6-1 mm wide		Pinus halepensis Mill.
31	Leaf-sheaths brown and thick in the lower half, thin and transparent in the upper half. Leaves 1.2-1.4 mm wide		Pinus sylvestris L.
32	Trunk reddish. Crown umbrella-like		Pinus pinea L.
32	Trunk grey. Crown not umbrella-like		Pinus nigra J.F. Arnold subsp. nigra
33	Leaves arranged in whorls at the nodes		Rubia peregrina L.
33	Leaves not whorled		34
34	Leaves opposite		35
34	Leaves alternate		77







35	Woody climbers		36
35	Trees or shrubs		40
36	Leaves simple. Flowers bilaterally symmetrical. Fruit fleshy		37
36	Leaves compound (completely divided into leaflets). Flowers radially symmetrical. Fruit dry		39
37	Inflorescence sessile, arising directly from the uppermost pair of leaves		38
37	Inflorescence clearly stalked		<p style="text-align: center;">Lonicera etrusca Santi</p>
38	Leaves deciduous. Corolla-lobes >15 mm long. Style hairless (lens!)		<p style="text-align: center;">Lonicera caprifolium L.</p>
38	Leaves evergreen. Corolla-lobes >15 mm long. Style hairy		<p style="text-align: center;">Lonicera implexa Aiton subsp. implexa</p>







39	Leaves 2-4- pinnate. Petals hairy on the lower surface only		Clematis flammula L.
39	Leaves 1-pinnate. Petals hairy on both surfaces		Clematis vitalba L.
40	Leaves compound (completely divided into leaflets)		41
40	Leaves simple (but sometimes deeply lobed)		47
41	Leaves palmate		Aesculus hippocastanum L.
41	Leaves pinnate		42
42	Leaves foul-smelling when crushed. Fruit fleshy		Sambucus nigra L.
42	Leaves odourless when crushed. Fruit dry		43








43	Fruit swollen, not winged (look for fruits below the tree!)		Staphylea pinnata L.
43	Fruit not swollen, winged		44
44	Fruits paired on a common stalk		Acer negundo L.
44	Fruits not paired		45
45	Buds grey to pale brown. Flowers white, with petals		Fraxinus ornus L. subsp. ornus
45	Buds dark (black to dark brown). Flowers greenish, without petals		46
46	Leaflets with more teeth than secondary veins. Buds black		Fraxinus excelsior L. subsp. excelsior







46	Leaflets with as many teeth as secondary veins. Buds dark brown		Fraxinus angustifolia Vahl subsp. oxycarpa (Willd.) Franco & Rocha Afonso
47	Leaves lobed		48
47	Leaves not lobed		53
48	Leaves with 3 lobes		Acer monspessulanum L. subsp. monspessulanum
48	Leaves with 5 lobes		49
49	Fruit-wings forming an obtuse angle to each other or perpendicular to the fruit-stalk		50
49	Fruit-wings forming an acute angle to each other		52
50	Leaves in average <10 cm long (measure at least 10 leaves)		Acer campestre L.
50	Leaves in average <10 cm long		51








51	Leaf-lobes with an entire margin		Acer cappadocicum Gled. subsp. lobelii (Ten.) Murray
51	Leaf-lobes with a toothed margin		Acer platanoides L.
52	Leaf-lobes acute. Flowers and fruits arranged in racemes that are much longer than wide		Acer pseudoplatanus L.
52	Leaf-lobes obtuse. Flowers and fruits arranged in umbrella-like corymbs		Acer opalus Mill. subsp. obtusatum (Waldst. & Kit. ex Willd.) Gams
53	Plants with twigs ending in a spine		54
53	Plants without spines		56
54	Leaf-stalk >1 cm and leaf-blade 3- 5 cm long		Rhamnus cathartica L.
54	Leaf-stalk 1-5 mm long and leaf-blade 1-3 cm long		55









55	Leaves c. 2 times as long as wide, > 1.5 cm wide, wedge-shaped at base. Leaf-stalk longer than stipules. Fruit with 2-4 seeds		Rhamnus saxatilis Jacq. subsp. saxatilis
55	Leaves c. 1.2 times as long as wide, <1.5 cm long, rounded at base. Leaf-stalk shorter than stipules. Fruit with 2 seeds		Rhamnus saxatilis Jacq. subsp. infectoria (L.) P. Fourn.
56	Leaves with a strong smell of rosemary		Rosmarinus officinalis L.
56	Leaves not smelling of rosemary		57
57	Small shrubs with white or pink, >3 cm wide flowers and strongly wrinkled leaves		58
57	Tree or shrubs with < 3 cm wide pink or white flowers (if flowers >3 cm wide, then they are bright yellow)		60
58	Flowers white		Cistus salvifolius L.
58	Flowers pink		59









59	Leaf-margin not wavy, Plant not sticky, without glandular hairs		Cistus creticus L. subsp. eriocephalus (Viv.) Greuter & Burdet
59	Leaf-margin wavy. Plant sticky, with glandular hairs		Cistus creticus L. subsp. creticus
60	Leaves white-hairy, blue- green or silvery grey at least on one surface		61
60	Leaves green on both surfaces		63
61	Leaves evergreen, leathery		Olea europaea L.
61	Leaves deciduous, not leathery		62
62	Leaves at least 3 times as long as wide, hairless and glaucous beneath, stalkless. Flowers without petals. Fruit ddry		Salix amplexicaulis Bory
62	Leaves <3 times as long as wide, white-hairy beneath, stalked. Flowers with petals. Fruit fleshy		Viburnum lantana L.








63	Leaf-margin toothed		64
63	Leaf-margin entire		67
64	Leaves evergreen, leathery. Flowers and fruits in leaf-axils. Fruit fleshy		Phillyrea latifolia L.
64	Leaves deciduous, not leathery. Flowers and fruits not in leaf-axils. Fruit dry (a 4-5-lobed capsule)		65
65	Young twigs with conspicuous black warts		Euonymus verrucosus Scop.
65	Young twigs without black warts		66
66	Flowers in clusters of 2-6 on 1-3 cm long pedicels. Leaves usually < 8 cm long. Petals 4		Euonymus europaeus L.
66	Flowers in clusters of 5-15 on 4-6 cm long pedicels. Leaves usually >8 cm long. Petals 4 or 5		Euonymus latifolius (L.) Mill.









67	Leaves clasping stem with base. Flowers yellow and >1 cm wide		Hypericum androsaemum L.
67	Leaves not clasping stem with base. Flowers different		68
68	Leaves evergreen, leathery		69
68	Leaves deciduous, not leathery		72
69	Leaves stalkless or with a <4 mm long stalk. Flowers in leaf-axils		Buxus sempervirens L.
69	Leaf-stalk >4 mm. Flowers and fruits arranged in racemes or corymbs		70
70	Leaves hairy at least beneath. Flowers and fruits arranged in corymbs which are wider than long		Viburnum tinus L. subsp. tinus
70	Leaves hairless. Flowers and fruits arranged in racemes which are longer than wide		71
71	Leaves <6 cm long. Racemes <8 cm long. Axis of inflorescence finely downy		Ligustrum vulgare L.








71	Leaves >6 cm long. Racemes >8 cm long. Axis of inflorescence hairless		Ligustrum lucidum Aiton
72	Flowers and fruits arranged in racemes or corymbs		73
72	Flowers and fruits in leaf-axils		74
73	Leaf-stalk >1 cm. Petals free. Inflorescence umbrella-like (a corymb), wider than long		Cornus sanguinea L. subsp. hungarica (Kárpáti) Soó
73	Leaf-stalk <1 cm. Petals fused. Inflorescence pyramidal (a raceme), longer than wide		Ligustrum vulgare L.
74	Flowers yellow, radially symmetrical, produced before the leaves. Fruit oval, longer than wide		Cornus mas L.
74	Flowers not yellow and radially symmetrical, produced after the leaves. Fruit subglobose		75







75	Fruit black. Leaves obtuse		Lonicera nigra L.
75	Fruit red. Leaves acute		76
76	Leaves 10-14 cm long. Flowers reddish. Fruits fused into a single berry. Branches with a solid, persistent, white pith		Lonicera alpigena L. subsp. alpigena
76	Leaves 5-6 cm long. Flowers whitish. Fruits fused only at the base. Branches with a brown pith, soon becoming hollow		Lonicera xylosteum L.
77	Leaves compound (divided into separate leaflets)		78
77	Leaves simple		120
78	Plant with spines		79
78	Plant without spines		103
79	Flowers bilaterally symmetrical. Fruit dry (a legume)		80
79	Flowers radially symmetrical. Fruit fleshy		82







80	Leaves pinnate, with more than 3 leaflets. Flowers white		<p>Robinia pseudacacia L.</p>
80	Leaves with 3 leaflets. Flowers yellow		81
81	Dwarf shrub to 60 cm tall. Calyx with 5 acute teeth		<p>Cytisus spinescens C. Presl</p>
81	Shrub much taller than 1 m. Calyx without evident teeth or with indistinct obtuse teeth		<p>Calicotome spinosa (L.) Link</p>
82	Flowers <2 cm across. Fruit resembling a blackberry (WARNING! difficult group, in doubt stop at Rubus sp.)		83
82	Flowers >3 cm across. Fruit not resembling a blackberry (WARNING! difficult group, in doubt stop at Rosa sp.)		89
83	Leaves pinnate (rarely 3-foliolate). Fruit red when ripe		<p>Rubus idaeus L. subsp. idaeus</p>
83	Leaves palmate or 3-foliolate. Fruit black to blue when ripe		84








84	Fruit with 2-20 drupelets. Stipules lanceolate (wider in the middle), not thread-like		85
84	Drupelets usually more than 20. Stipules linear, thread-like		86
85	Fruits with a bluish bloom. Leaves 3-foliolate		Rubus caesius L.
85	Fruits lacking a bluish bloom. Leaves with 3-5 leaflets		Rubus sect. Corylifolii Lindl.
86	All prickles stout, curved. Stems of the current year without glandular hairs		87
86	Prickles very variable, some of them stout, the others thin and more or less straight. Stems of the current year with more or less abundant glandular hairs		88
87	Flowers pink. Stems of the current year with a bluish bloom. Stamens as long as styles or shorter		Rubus ulmifolius Schott
87	Flowers white. Stems of the current year lacking a bluish bloom. Stamens > styles		Rubus candicans Weihe







88	Leaves white-hairy beneath (at least when young) with dense branched hairs		Rubus canescens DC.
88	Leaves green or grey-green beneath, without branched hairs		Rubus hirtus Waldst. & Kit.
89	Styles fused together into a cylindrical column		90
89	Styles free, grouped into a pillow which is wider than long		91
90	Leaves evergreen, leathery, shiny. Upper prickles curved, stout		Rosa sempervirens L.
90	Leaves deciduous, not leathery, dull. Upper prickles straight, thin		Rosa arvensis Huds.
91	Sepals entire. Leaves with 7-11 leaflets		92
91	At least 3 sepals pinnate. Leaves with 5-7 leaflets		93








92	Flowers deep pink. Prickles sparse and weak, absent on flowering branches. Ripe fruit oval		Rosa pendulina L.
92	Flowers white. Prickles numerous also on flowering branches. Ripe fruit globose		Rosa spinosissima L.
93	Sepals erect to spreading, usually persisting in the fruit		94
93	Sepals reflexed, falling early and absent in the fruit		96
94	Pedicels of flowers and fruits glandular-hairy. Young branches without a blue-green frost		Rosa montana Chaix
94	Pedicels of flowers and fruits hairless. Young branches with a blue-green-frost		95
95	Fruit oval. Disc of styles with a c. 2 mm wide central gap		Rosa glauca Pourr. non al.








95	Fruit globose. Disc of styles with a <2 mm wide central gap		Rosa dumalis Bechst.
96	Leaves densely glandular-sticky beneath		97
96	Leaves without glands beneath, or with a few glands confined to the main veins		98
97	Fruit-pedicels hairless		Rosa agrestis Savi
97	Fruit-pedicels with glandular hairs		Rosa micrantha Borrer ex Sm.
98	Leaves hairy beneath at least on the veins		99
98	Leaves hairless		100
99	Leaves simply toothed. Leaf-axis without glands		Rosa corymbifera Borkh.







99	Leaves doubly toothed. Leaf-axis with sparse glands (lens!)		Rosa balsamica Besser
100	Pedicels of flowers and fruits with glandular hairs		Rosa nitidula Besser
100	Pedicels of flowers and fruits without glandular hairs		101
101	Leaves with glands on the stalk, main axis and central vein of leaflets		Rosa squarrosa (Rau) Boreau
101	Leaves without glands		102
102	Stigmatic disc with a central gap of 0,5-0,7(-0,8) mm		Rosa canina L.
102	Stigmatic disc with a central gap of 0,9-1,1 mm (lens!)		Rosa subcanina (Christ) Vuk.








103	Leaves with 3 leaflets		104
103	Leaves with more than 3 leaflets		108
104	Leaflets 1-3 x 3-6 cm. Flowers and fruits arranged in hanging racemes		105
104	Leaflets much smaller. Flowers and fruits not arranged in hanging racemes		106
105	Twigs with close-pressed-hairs, greyish-green. Legume with close-pressed-hairs, later more or less hairless		Laburnum anagyroides Medik. subsp. anagyroides
105	Twigs and mature legumes hairless or almost so		Laburnum alpinum (Mill.) Bercht. & J. Presl
106	Plant hairless. At least the lower leaves stalkless or almost so		Cytisophyllum sessilifolium (L.) O. Lang
106	Plants hairy. All leaves clearly stalked		107







107	Plant 50-100 cm tall. Calyx-tube to 3 mm long		Cytisus villosus Pourr.
107	Plant 20-40 cm tall. Calyx-tube >5 mm long		Cytisus hirsutus L. s.l.
108	Leaf-margin entire (rarely with a few indistinct teeth)		109
108	Leaf-margin toothed		116
109	Flowers violet. Fruit a red berry		Solanum dulcamara L.
109	Flowers not violet. Fruit different		110
110	Leaves with a strong smell when crushed. Fruit not a legume		111
110	Leaves almost odourless. Fruit not a legume		113
111	Leaves with >11 leaflets, foul-smelling when crushed. Fruit dry, winged		Ailanthus altissima (Mill.) Swingle
111	Leaves with <11 leaflets, with an aromatic scent when crushed. Fruit fleshy, not winged		112








112	Terminal leaflet much bigger than the others. Fruit >2 cm. Tree		Juglans regia L.
112	Terminal leaflet similar to the others. Fruit <2 cm. Shrub		Pistacia terebinthus L. subsp. terebinthus
113	Flowers white		Robinia pseudacacia L.
113	Flowers bright yellow		114
114	Flowers and fruits arranged in pendulous racemes. Fruit strongly swollen		Colutea arborescens L.
114	Flowers and fruits arranged in umbels. Fruit linear, not swollen		115
115	Corolla >12 mm. Standard (upper petal) with a claw which is 2-3 times as long as calyx		Emerus major Mill. subsp. emeroides (Boiss. & Spruner) Soldano & F. Conti








115	Corolla <12 mm. Standard with a claw which is c. as long as calyx		Coronilla valentina L.
116	Leaves with an aromatic scent when crushed		Juglans nigra L.
116	Leaves odourless or foul- smelling when crushed		117
117	Flowers red to deep pink, >4 cm across		Rosa pendulina L.
117	Flowers white to greenish, >1 cm across		118
118	Leaves strongly hairy, the main axis winged. Flowers greenish, arranged in erect racemes. Fruit dry		Rhus coriaria L.
118	Leaves hairless or with sparse hairs, the main axis not winged. Flowers white, arranged in umbrella-like corymbs. Fruit fleshy		119
119	Buds glabrous and sticky. Styles 5. Ripe fruit at least 2 cm wide, yellow to orange-red, dotted		Sorbus domestica L.








119	Buds hairy, not sticky. Styles 3-4. Ripe fruit <1 cm wide, bright red, without dots		Sorbus aucuparia L. s.l.
120	Woody climbers		121
120	Trees or shrubs		124
121	Plant spiny		Smilax aspera L.
121	Plants without spines		122
122	Leaves evergreen. Flowers and fruits arranged in simple umbels		Hedera helix L. s.l.
122	Leaves deciduous. Flowers and fruits arranged in racemes or corymbs		123
123	Flowers greenish. Plant clinging to supports with tendrils. Fruits not red		Vitis vinifera L. subsp. vinifera
123	Flowers violet. Plant without tendrils. Fruits bright red		Solanum dulcamara L.








124	Leaves lobed		125
124	Leaves not lobed		139
125	Plants with spines on stems, or with twigs ending with a spine		126
125	Plants without spines		128
126	Leaves palmately veined. Flowers not white. Fruit greenish		Ribes uva-crispa L.
126	Leaves pinnately-veined. Flowers white. Fruit red		127
127	Leaf-lobe margin with a few teeth at the apex only, otherwise entire. Flowers with 1 style. Fruits with 1 seed		Crataegus monogyna Jacq.
127	Leaf-lobe margin regularly toothed throughout. Flowers with 2 styles. Fruit with 2 seeds		Crataegus laevigata (Poir.) DC.
128	Plant with a milky sap (break a leaf-stalk!)		Ficus carica L.
128	Plants without milky sap		129








129	Small shrubs. Fruit a berry		130
129	Trees or tall shrubs. Fruit not a berry		132
130	Leaves 2-3 cm long. Bracts 4-10 mm long. Axis of inflorescence glandular-hairy. Flowers unisexual, borne on male and female plants		Ribes alpinum L.
130	Leaves usually > 4 cm long. Bracts 1-2 mm. Axis of inflorescence without glandular hairs. Flowers hermaphrodite		131
131	Leaves strongly hairy beneath. Sepals ligulate, bent backwards		Ribes multiflorum Roem & Schult.
131	Leaves hairless or with a few sparse hairs beneath. Sepals obovate to spatulate, erect or spreading, not bent backwards		Ribes petraeum Wulfen
132	Leaves not pentagonal in outline		133
132	Leaves more or less pentagonal in outline		136








133	Shrub. Flowers hermaphrodite, with petals. Fruit fleshy		Sorbus torminalis (L.) Crantz
133	Trees. Flowers unisexual, without petals. Fruit dry (acorn)		134
134	Acorn-cup with spreading to erect scales (look for acorns below the tree!)		Quercus cerris L.
134	Acorn-cup with close-pressed scales		135
135	Leaves hairless or almost so beneath (except sometimes near the main veins). Leaf-stalk to 4 mm long. Acorns long-stalked		Quercus robur L. subsp. robur
135	Leaves obviously hairy beneath. Leaf-stalk >6 mm long. Acorns sessile		Quercus pubescens Willd. subsp. pubescens
136	Leaves green above, white-hairy beneath. Fruit dry		Populus alba L.








136	Leaves green on and never completely white-hairy beneath. Fruit fleshy		137
137	Shrub or small tree. Leaves densely hairy beneath and on the leaf-stalks		Broussonetia papyrifera (L.) Vent.
137	Small to tall trees. Leaves glabrous or with a few sparse hairs beneath and on the leaf-stalks		138
138	Leaves sparsely hairy and rough above, the stalks often <1.5 cm long. Fruits almost sessile, with dark flesh		Morus nigra L.
138	Leaves glabrous and smooth above, the stalks >1.5 cm. Fruits borne on 1-2 cm long stalks, with whitish flesh		Morus alba L.
139	Plants prickly (with spines on leaves or stems, or with twigs ending with a spine)		140
139	Plants not prickly, without spines		153
140	Spines limited to the apex or margins of leaves		141
140	Spines absent from leaves (limited to stems or tips of twigs)		143









141	With a single spine at the apex of the leaf (it is not a true leaf, but a modified stem!)		Ruscus aculeatus L.
141	With several spines along the margin of the leaf		142
142	Leaves hairless beneath. Flowers with petals. Fruit fleshy		Ilex aquifolium L.
142	Leaves grey-hairy beneath. Flowers without petals. Fruit dry (an acorn)		Quercus ilex L. subsp. ilex
143	Leaves evergreen, leathery		Pyracantha coccinea M. Roem.
143	Leaves deciduous, not leathery		144
144	Flowers bright yellow. Spines scattered along the branches		145
144	Flowers white or greenish. Spines limited to the tip of branches		146







145	Twigs zig-zagging. Fruit dry, winged		Paliurus spinachristi Mill.
145	Twigs more or less straight. Fruit fleshy		Berberis vulgaris L. subsp. vulgaris
146	Petals 4, greenish-yellow. Fruit usually <7 mm across		147
146	Petals 5, white. Fruit usually >7 mm across		149
147	Leaf-stalk >1 cm and leaf-blade 3- 5 cm long		Rhamnus cathartica L.
147	Leaf-stalk 1-5 mm long and leaf-blade 1-3 cm long		148
148	Leaves c. 2 times as long as wide, > 1.5 cm wide, wedge-shaped at base. Leaf-stalk longer than stipules. Fruit with 2-4 seeds		Rhamnus saxatilis Jacq. subsp. saxatilis
148	Leaves c. 1.2 times as long as wide, <1.5 cm long, rounded at base. Leaf-stalk shorter than stipules. Fruit with 2 seeds		Rhamnus saxatilis Jacq. subsp. infectoria (L..) P. Fourn.









149	Ovary semi-inferior, lying at the bottom of a cup-shaped receptacle. Fruit blue, with a single seed		Prunus spinosa L. subsp. spinosa
149	Ovary inferior, completely surrounded by the receptacle. Fruit not blue, with several seeds		150
150	Leaves dull above. Anthers whitish or yellow		Malus sylvestris (L.) Mill.
150	Leaves somewhat shiny above. Anthers reddish		151
151	Leaves >2 times as long as wide		Pyrus spinosa Forssk.
151	Leaves <2 times as long as wide		152
152	Calyx persistent in the fruit		Pyrus communis L.
152	Calyx not persistent in the fruit		Pyrus cordata Desv.







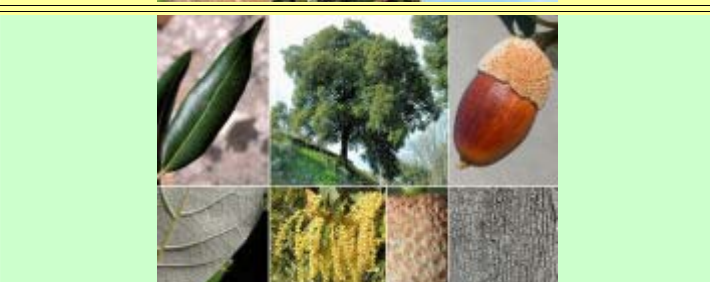
153	Leaves more or less triangular or rhombic in outline		154
153	Leaves not triangular nor rhombic in outline		158
154	Leaves green above, white-felted beneath		Populus alba L.
154	Leaves green on both surfaces		155
155	Leaf-margin with dense acute teeth. Bark white and papery. Fruits not a capsule, gathered in structures resembling catkins		Betula pendula Roth
155	Leaf-margin with sparse blunt teeth. Bark not papery. Fruits capsules, arranged in hanging racemes		156
156	Leaf-stalk strongly flattened. Leaves dull, without translucent margin (lens!)		Populus tremula L.
156	Leaf-stalk not strongly flattened. Leaves somewhat shiny at least when young, with a translucent margin (very thin, but evident)		157







157	Leaves bluntly and often obscurely toothed, without glands at junction with stalk		Populus nigra L.
157	Leaves conspicuously toothed, usually with glands at junction with stalk		Populus canadensis Moench
158	Leaves heart-shaped at base		159
158	Leaves not heart-shaped at base		169
159	Leaf-margin entire		Cercis siliquastrum L. subsp. siliquastrum
159	Leaf-margin toothed		160
160	Seeds gathered in structures resembling small woody cones		Alnus cordata (Loisel.) Loisel.
160	Seeds not gathered in structures resembling small woody cones		161








161	Leaves dull above. Fruit dry		162
161	Leaves somehow shiny above, at least when young. Fruit fleshy		165
162	Leaf-stalk <3 cm. Fruits short-stalked, surrounded by a green sheath. Shrubs		163
162	Leaf-stalk >3 cm. Fruits borne on long stalks with a perpendicular wing in the middle. Trees		164
163	Fruit completely surrounded by the sheath. Plant in cultivation		<i>Corylus maxima</i> Mill.
163	Fruit surrounded by the sheath only at the base. Wild plant		<i>Corylus avellana</i> L.
164	Lower face of leaves with tufts of rust-coloured hairs in the axils of the main veins. Fruit smooth or weakly ridged		<i>Tilia cordata</i> Mill.
164	Lower face of leaves with tufts of whitish hairs. Fruit with 5 obvious longitudinal ridges		<i>Tilia platyphyllos</i> Scop. s.l.









165	Flowers without petals. Fruit resembling a blackberry		166
165	Flowers with petals. Fruit different		168
166	Shrub or small tree. Leaves densely hairy beneath and on the leaf-stalks		Broussonetia papyrifera (L.) Vent.
166	Small to tall trees. Leaves glabrous or with a few sparse hairs beneath and on the leaf-stalks		167
167	Leaves glabrous and smooth above, the stalks >1.5 cm. Fruits borne on 1-2 cm long stalks, with whitish flesh		Morus alba L.
167	Leaves sparsely hairy and rough above, the stalks often <1.5 cm long. Fruits almost sessile, with dark flesh		Morus nigra L.
168	Leaf-stalk <3 cm. Anthers yellow. Fruit black, with a single seed, <1 cm across		Prunus mahaleb L.








168	Leaf-stalk >3 cm. Anthers reddish. Fruit not black, with several seeds (pear), >1 cm across		<i>Pyrus communis</i> L.
169	Leaf-base not symmetrical		170
169	Leaf-base symmetrical		172
170	Leaf-base with three diverging main veins. Fruit fleshy		<i>Celtis australis</i> L. subsp. <i>australis</i>
170	Leaf-base with a single, central main vein. Fruit dry, winged		171
171	Young twigs hairy. Leaves usually >10 cm long, with 12-18 pairs of lateral veins		<i>Ulmus glabra</i> Huds.
171	Young twigs hairless or almost so. Leaves <10 cm long, with 7-12 pairs of lateral veins		<i>Ulmus minor</i> Mill. subsp. <i>minor</i>
172	Leaves evergreen, leathery		173







172	Leaves deciduous, not leathery		183
173	Leaf-margin entire		174
173	Leaf-margin toothed		176
174	Leaves grey-hairy beneath. Flowers without petals,. Fruit dry (an acorn)		Quercus ilex L. subsp. ilex
174	Leaves green on both faces. Flowers with petals. Fruit fleshy		175
175	Flowers greenish. Fruit smooth, < 8 mm across. Wood foul-smelling (peel a twig!)		Rhamnus alaternus L. subsp. alaternus
175	Flowers white. Fruit warty, > 8 mm across. Wood not foul-smelling		Arbutus unedo L.
176	Leaves green above, grey-hairy beneath. Fruit dry (an acorn)		Quercus ilex L. subsp. ilex
176	Leaves green on both surfaces. Fruit fleshy		177









177	Leaf-margin obviously undulate (wavy). Trees, or >1.5 m tall shrubs		178
177	Leaf-margin not wavy. Small shrubs, usually < 1.5 m tall		179
178	Leaves without white margin, strongly smelling of bay. Flowers yellow. Fruit black		Laurus nobilis L.
178	Leaves with a thin white margin, not smelling of bay. Flowers white. Fruit red		Ilex aquifolium L.
179	Leaves (actually stems resembling leaves!) bearing flowers and fruits on their surface		Ruscus hypoglossum L.
179	Plants with true leaves		180
180	Stems prostrate. Corolla bell-shaped, with 5 teeth (petals)		Arctostaphylos uva-ursi (L.) Spreng.
180	Stems erect. Corolla not bell-shaped, with 4 lobes		181








181	Flowers white		Daphne oleoides Schreb.
181	Flowers pink or greenish		182
182	Flowers greenish. Leaves usually >1.5 cm wide		Daphne laureola L.
182	Flowers pink. Leaves < 1.5 cm wide		Daphne sericea Vahl
183	Plant with a milky sap (WARNING: the sap is irritating!). Flowers without petals		Euphorbia characias L. subsp. characias
183	Plants without a milky sap. Flowers with petals		184
184	Leaves stalkless or with a <3 mm long stalk		185
184	Leaf-stalk >3 mm long		191
185	Leaf- margin toothed		Vaccinium myrtillus L.







185	Leaf-margin entire		186
186	Flowers bilaterally symmetrical. Fruit dry (a legume)		187
186	Flowers radially symmetrical. Fruit fleshy		189
187	Tall shrub, >1 m		Spartium junceum L.
187	Dwarf shrubs, <1 m tall		188
188	Stems erect. Plant hairless or with a few sparse hairs. Calyx teeth shorter than tube		Genista tinctoria L.
188	Stems prostrate. Young shoots, flower pedicels and calyx strongly hairy. Calyx teeth longer than tube		Cytisus decumbens (Durande) Spach
189	Petals 3, yellow, free		Osyris alba L.
189	Petals 4, white or pink, fused		190







190	Flowers white, produced after the leaves		Daphne alpina L.
190	Flowers pink, produced before the leaves		Daphne mezereum L.
191	Leaves >4 times as long as wide		192
191	Leaves <4 times as long as wide		197
192	Leaves usually >15 cm long. Fruits surrounded by a spiny husk		Castanea sativa Mill.
192	Leaves usually <15 cm long. Fruits not surrounded by a spiny husk		193
193	Flowers with petals. Fruit fleshy		Prunus dulcis (Mill.) D.A. Webb
193	Flowers without petals. Fruit dry		194
194	Adult leaves strongly hairy at least beneath		195








194	Adult leaves hairless or almost so on both surfaces		196
195	Shrub. Leaves 8-20 times as long as wide, with a revolute margin. Leaf-stalks without glands		Salix eleagnos Scop. s.l.
195	Tree. Leaves 4-8 times as long as wide, the margin not revolute. Leaf-stalks with 2-3 pairs of glands near the junction with the blade		Salix alba L.
196	Leaves shiny above, <6 times as long as wide, not blackening when dry. Leaf-stalks with 1-3 pairs of glands (lens!). Fruits hairless		Salix triandra L. subsp. amygdalina (L.) Schübl. & G. Martens
196	Leaves dull above, to 10 times as long as wide, blackening when dry. Leaf-stalks without glands. Fruits hairy		Salix purpurea L. subsp. purpurea
197	Leaf-stalk strongly flattened perpendicularly to the leaf-blade		Populus tremula L.
197	Leaf- stalk not strongly flattened		198
198	Dwarf shrubs, <50 cm tall		199









198	Trees, or >50 cm tall shrubs		202
199	Leaf-veins forming an obvious network. Flowers without petals, arranged in erect, male and female spikes (willows)		200
199	Leaf-veins not forming an obvious network. Flowers with petals. Fruit fleshy		201
200	Stems more or less erect. Leaves acute, 2-3 x 4-5 cm		Salix breviserrata Flod.
200	Stems prostrate, creeping. Leaves obtuse to notched at apex, 4-10 x 10-25 mm		Salix retusa L.
201	Stems green, not creeping on rocks. Petals fused in a bell-shaped corolla with 5 teeth. Ripe fruit blue		Vaccinium myrtillus L.
201	Stems grey to brown, creeping on rocks. Petals spreading. Ripe fruit black		Rhamnus pumila Turra
202	Leaf-veins forming a clear network. Plants with unisexual flowers arranged in erect, male and female spikes. Fruit a capsule (willows)		203








202	Leaf-veins not forming an obvious network. Plants with other characters		205
203	Leaves shiny above		Salix apennina A.K. Skvortsov
203	Leaves dull above		204
204	Tree to tall shrub. Peeled twigs without narrow paler ridges		Salix caprea L.
204	Shrub. Peeled twigs with narrow paler ridges		Salix cinerea L.
205	Leaf-margin entire		206
205	Leaf-margin toothed		210
206	Shrubs rarely exceeding 2 m, the leaves green above, grey-felted beneath		207
206	Trees, or shrubs taller than 2 m		208



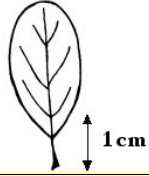
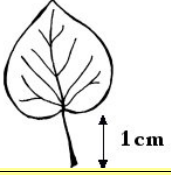



207	Flower-pedicels and sepals hairless. Leaves almost hairless above		Cotoneaster mathonnetii Gand.
207	Flower-pedicels and sepals grey-hairy. Leaves with sparse hairs above		Cotoneaster tomentosus (Aiton) Lindl.
208	Leaves grey-hairy beneath. Fruit > 4 cm across		Cydonia oblonga Mill.
208	Leaves green on both surfaces. Fruit < 4 cm across		209
209	Margin of leaves ciliate (with many straight hairs). Flowers without petals. Fruit dry		Fagus sylvatica L. subsp. sylvatica
209	Margin of leaves not ciliate. Flowers with petals. Fruit fleshy		Mespilus germanica L.
210	Leaves green above, grey- to white-hairy beneath		211
210	Leaves green on both surfaces		214




211	Plants usually <2 m tall. Petals >3 times as long as wide. Fruit blue-black when ripe		212
211	Plants >2 m tall. Petals <3 times as long as wide. Fruit not blue-black when ripe		213
212	Leaves with 8-13 pairs of lateral veins. Fruit hairless		Amelanchier ovalis Medik. subsp. ovalis
212	Leaves with 6-8 pairs of lateral veins. Fruit (in summer) with long white hairs on the stalk and calyx		Amelanchier ovalis Medik. subsp. cretica (Willd.) Pignatti
213	Flowers and fruits arranged in umbrella-like corymbs. Leaves white-hairy beneath		Sorbus aria (L.) Crantz s.l.
213	Flowers and fruits not arranged in umbrella-like corymbs. Leaves grey-hairy beneath		Malus domestica (Borkh.) Borkh.
214	Leaves >15 cm long. Fruits covered by a softly spiny husk (chestnut)		Castanea sativa Mill.
214	Leaves usually <15 cm long. Fruits not covered		215

	by a spiny husk		
215	Leaves of shoots lobed. Fruit resembling a blackberry		Morus alba L.
215	No leaf is lobed. Fruit not resembling a blackberry		216
216	Flowers without petals. Fruit dry		217
216	Flowers with petals. Fruit fleshy		220
217	Young twigs sticky. Fruits gathered in a small, woody cone		Alnus glutinosa (L.) Gaertn.
217	Young twigs not sticky. Fruits different		218
218	Leaves widest below the middle. Fruit with an entire wing		Ostrya carpinifolia Scop.
218	Leaves widest in the middle. Fruit with a 3-lobed to toothed wing		219

219	Leaves >4 cm long, the stalk of 2-4 mm. Wing of fruit toothed		Carpinus orientalis Mill. subsp. orientalis
219	Leaves >4 cm long, the stalk of c. 1 cm. Wing of fruit 3-lobed		Carpinus betulus L.
220	Flowers greenish, <1 cm across. Wood foul-smelling (peel a twig!)		221
220	Flowers white or pink, > 1 cm across. Wood not foul-smelling		222
221	Young twigs glabrous. Leaves with max. 12 pairs of lateral veins. Fruit usually >6 mm across		Rhamnus alpinia L. subsp. fallax (Boiss.) Maire & Petitm.
221	Young twigs hairy. Leaves with 13-18 pairs of lateral veins. Fruit to 5 mm wide		Rhamnus alpinia L. subsp. alpina
222	Plants usually <2 m tall. Petals >3 times as long as wide		223
222	Plants >2 m tall. Petals <3 times as long as wide		224

223	Leaves with 8-13 pairs of lateral veins. Fruit hairless		Amelanchier ovalis Medik. subsp. ovalis
223	Leaves with 6-8 pairs of lateral veins. Fruit (in summer) with long white hairs on the stalk and calyx		Amelanchier ovalis Medik. subsp. cretica (Willd.) Pignatti
224	Ovary semi-inferior, at the bottom of a cup-shaped receptacle. Fruit with a single seed		225
224	Ovary inferior, completely surrounded by the receptacle. Fruit with several seeds		228
225	Leaves >3 times as long as wide. Fruit downy		Prunus dulcis (Mill.) D.A. Webb
225	Leaves <3 times as long as wide. Fruit hairless		226
226	Leaves clearly hairy at least beneath. Ripe fruits not red		Prunus domestica L. subsp. domestica
226	Leaves glabrous or with a few sparse hairs. Ripe fruits red		227

227	Shrub with subterranean stolons. Leaf-stalk usually <3 cm long, without glands		Prunus cerasus L.
227	Tree without stolons. Leaf-stalk >3 cm, with 2-3 red glands at the junction with blade		Prunus avium L. subsp. avium
228	Leaf-stalk < 1 cm		229
228	Leaf-stalk >1 cm		230
229	Leaves subglabrous. Flowers and fruits arranged in umbrella-like corymbs. Ripe fruit red		Sorbus chamaemespilus (L.) Crantz
229	Leaves hairy. Flowers and fruits solitary. Ripe fruit brown		Mespilus germanica L.
230	Leaves somewhat shiny above. Anthers red. Styles free. Fruit pear-shaped		Pyrus communis L.

230	Leaves dull above. Anthers whitish. Styles fused at base. Fruit apple-shaped		231
231	Leaves obviously hairy, at least beneath. Fruit >4 cm across		Malus domestica (Borkh.) Borkh.
231	Leaves hairless or almost so on both surfaces. Fruit <4 cm across		Malus sylvestris (L.) Mill.