

LEATHERY LEAVES: EVERGREEN BROAD-LEAVED TREES AND SHRUBS



Magnolia grandiflora, © Luis Fernández García Licence: Creative Commons Attribution-Share Alike 2.5 Spain

The what, how, where and why

Leathery (or, if you want to impress your neighbours, “coriaceous”) leaves are a major feature of tree and shrub plant life on a world scale. Some leathery-leaved species are deciduous, but the vast majority are evergreen, and broad-leaved evergreens heavily outnumber conifers and their relations.

Yet in Britain and Ireland, the native evergreen broad-leaved woody species number just four. To understand why this might be, we need to consider what sort of adaptation leatheriness is, and so remind ourselves what a leaf is for. Its primary functions are of course photosynthesis and respiration, both of which require the plant to exchange gases with the outside world. This is done through stomata, small pores on the leaf surface which can open and close with variations in environmental conditions.

But if a plant is adapted to losing gases from its stomata, it is also prone to losing water vapour. This can help in cooling the leaf, but in arid conditions it can place severe or fatal water stress on the plants. The earliest land plants evolved in an atmosphere rich in carbon dioxide and a relatively hot climate. Their stomata were few and mostly on the stem, proto-leaves being mere tiny outgrowths. Few stomata were needed in this atmospheric soup because carbon dioxide was abundant and readily taken up. Larger leaves with a few stomata would not have survived but would have cooked themselves in the warmer climate. With decreasing carbon dioxide levels, it became necessary for plants to develop structures with more stomata.

Most tropical plants are evergreens, which doesn't mean that they don't lose their leaves – they simply do it discreetly throughout the year, since the tropics don't have seasonal climates in the same way as more temperate or boreal climates. This is also true for most subtropical and some warm temperate zones.



In permanently arid areas, plants have adapted to reduce or modify their leaf structures and other organs to maintain reservoirs of water and reduce opportunities for loss – hence cacti, many Euphorbias and other succulents.

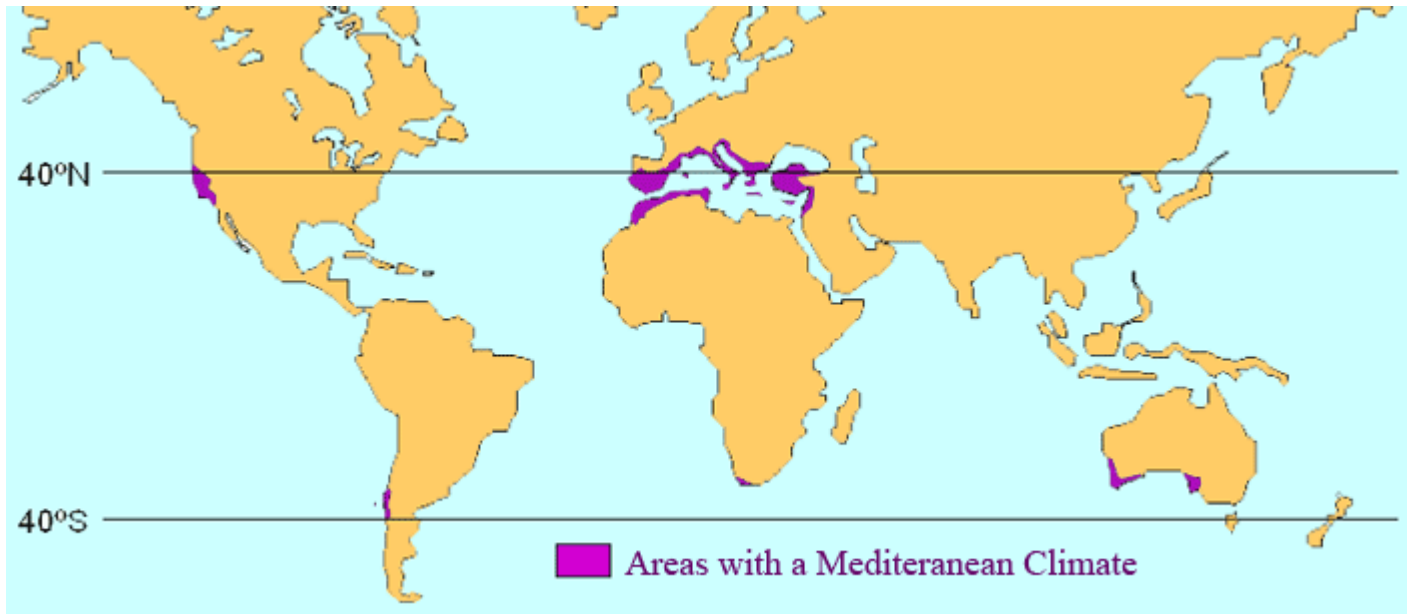
Euphorbia canariensis © Cayambe Licence: Creative Commons CC-SA 3.0 Unported



In seasonal climates in cooler regions, things get more interesting for us. Here there is the possibility of two rather different challenges, depending on region: a warm or hot arid period and a cold period. (Of course, in severe cold, the cold period will effectively also be arid.) A plant can be adapted to such adverse conditions by either avoiding them or tolerating them.

Quercus canariensis © Krzysztof Golik Licence: Creative CC-SA 4.0 International

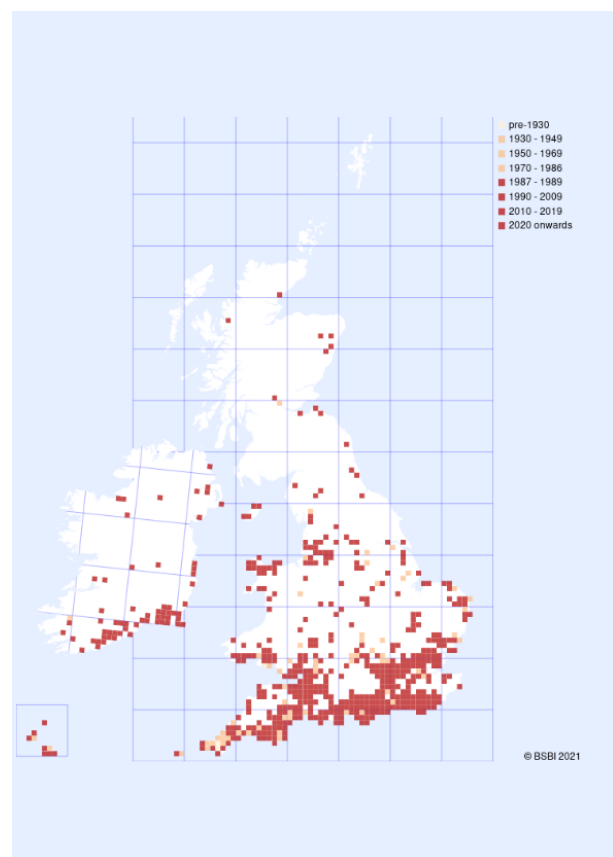
The avoidance strategy is to drop all your leaves in one brief spell; in short, be deciduous. This has an advantage that when a wet period comes on, your leaf form can be well-adapted for fast growth and a very productive metabolism, properties that species with a tolerance strategy may have to trade away to realise their other benefits. This is particularly true where seasonal episodes are rather unpredictable in their timing and duration. In cold-period climates with significant snowfall, the trees with a tolerance strategy (evergreens) are not in general broadleaves, since mechanical damage from retention of snow is a threat to their well-being. Their tough leaves with a small surface area (albeit often well provided with stomata) are not attuned to rapid unpredictable switching.



And that brings us to the cool-temperate and Mediterranean climates which come close to our own. Except for parts of the Scottish Highlands Britain is classed as ‘Atlantic’ (in other words, it still usually rains a lot in summer). The Mediterranean climate, with wet, mild winters and hot dry summers, is not limited to the Mediterranean itself. It embraces areas across the world, many of them on western ocean seabords where they grade into more temperate oceanic climates where summers are also kept relatively mild by the proximity of the sea. (This transition zone is often called ‘Mediterranean-Atlantic’). Until recently the Mediterranean climate had a reasonably predictable transition from the warm phase to the cool phase. A competitive advantage that broadleaved evergreens have in this situation is readiness to exploit the transition period for growth as soon as it occurs, with fully developed foliage; and in the regions with warmer winters, they can go on functioning throughout the winter. But they may still have to cope with a prolonged drought in summer, so they need to be robust.

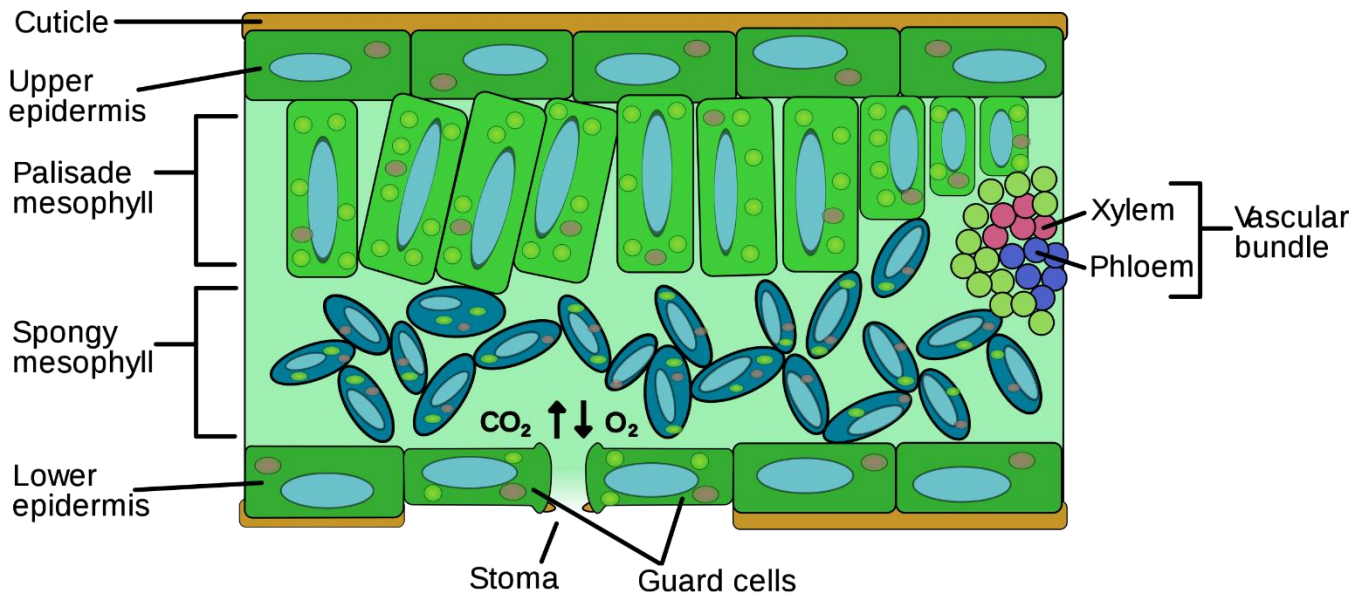
Our native broadleaved evergreens fall into this broad distributional pattern, with *Buxus sempervirens* (Box) being perhaps the most ‘Mediterranean’, *Arbutus unedo* (Strawberry-tree), with its little enclave in south-west Ireland the most ‘Mediterranean-Atlantic’, and *Ilex aquifolium* (Holly) the most ‘Atlantic’.

However, this very limited flora has now been augmented by many arrivals from other parts of the world, particularly those with affinities with Mediterranean but summer-wet climates. Virtually all of them have been introduced deliberately by man, mostly for horticulture; some are now invasive in the wild, and with climate change we can expect more of them to appear and become more widespread. Perhaps the most dramatic recent spread is that of *Laurus nobilis* (Bay). The darker red squares show where it has first been recorded since 1987. Pink squares show where it was already recorded before 1987.



What makes up a leathery leaf?

The short answer: much the same as makes up any leaf, but with certain features strongly developed.



Diagrammatic cross-section of a leaf. Image created by [H McKenna](#) using [Inkscape](#). Licence cc-by-sa-2.5

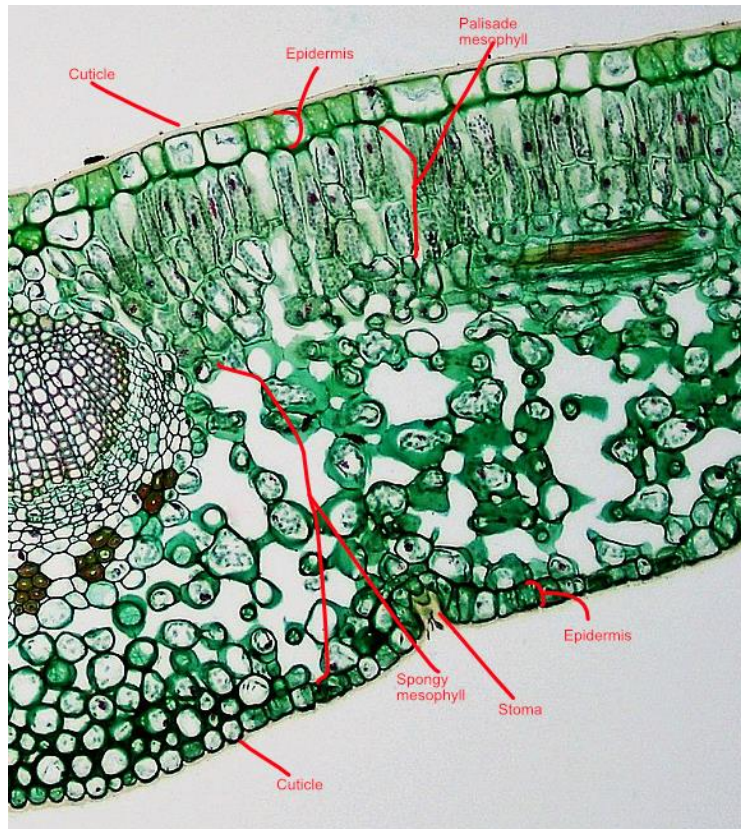
The **cuticle** is a waxy layer on the outside of the epidermis which provides some protection from the elements, excessive water and water vapour included. Nevertheless, many plants lose a small proportion of their own water by transpiration of water through the epidermis and cuticle. Many broad-leaved evergreens have a relatively thick cuticle on their upper surface that helps cut down this loss, and often the epidermis itself is thickened; these features give them much of their leatherness.

The **epidermal tissue** comes in several forms, including conventional cells, hair cells (trichomes), and guard cells for the stomata. They provide structure but apart from the guard cells do not contain many of the chloroplasts which are the engines for photosynthesis. They therefore have to be translucent to allow light to reach the mesophyll where the photosynthetic work is mostly done.

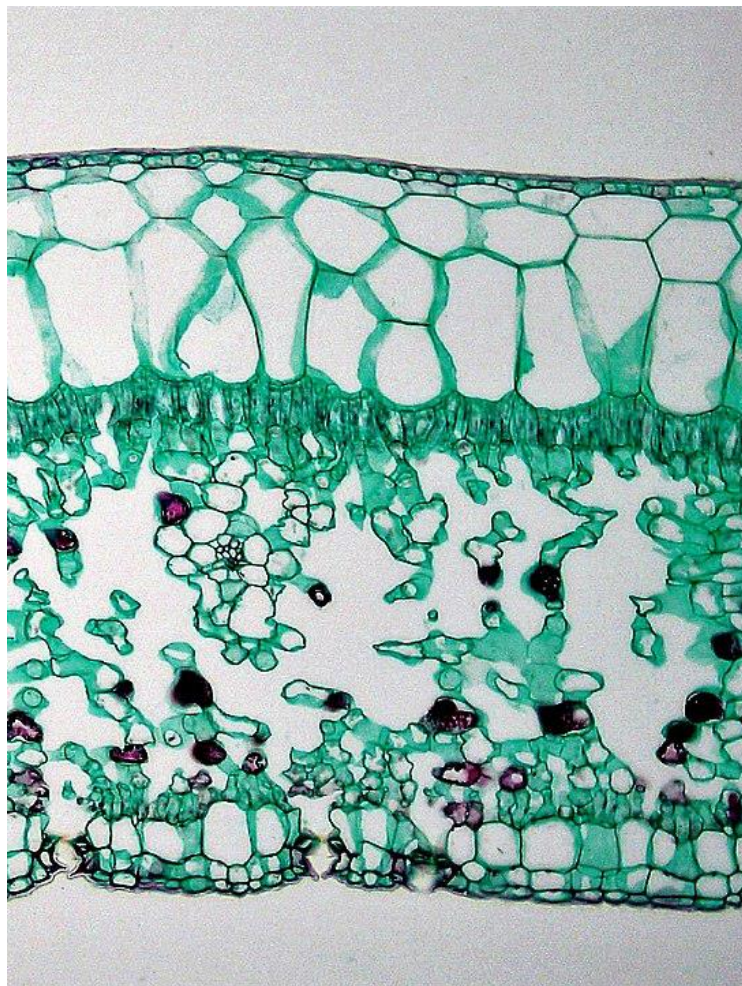
The **stomata** are the means of exchange of oxygen, carbon dioxide and water vapour between the leaf and the environment through transpiration and respiration. They are therefore the most important potential vector for water loss during dry and hot or windy weather. Most plants have most of their stomata on the lower surface, where they are better protected from desiccation. Leathery leaves rarely have upper-side stomata. They may have lower-side hairs or scales to help create a still-air environment, trap water close to the surface or simply provide an extra barrier layer.

The **palisade mesophyll** is the main photosynthesis engine of the leaf, and it contains more chloroplasts than the **spongy mesophyll** which acts more as a conduit of materials from the palisade to the leaf surface.

Here is a semi-evergreen, non-leathery leaf of a Privet (*Ligustrum*):



And here is the leathery leaf of a Fig (*Ficus*) for comparison:



Leaf morphology

One of the striking things about most of the leathery-leaved species that are acclimatised in our region is the lack of diversity in overall leaf form. Very few have compound or even prominently lobed leaves, although several are distinctively spiny.



Most are ovate-elliptic or nearly so; many are untoothed (entire) or minutely toothed. So one must look for the finer features when trying to identify them, especially as they are often not in flower when we want to record them. Twig and bud features, leaf arrangement on the stem, ridging at nodes, presence or absence of stipules, leaf shape at tip and base, venation, colour, hairs and scales may all be important.



The following pages have a key to the genera which are dealt with in this workshop, which includes most of the plants you are likely to record outside gardens or planted in places where you might want to record the wild plants that accompany them. But they are only a small selection of those you will encounter in gardens, and if you find something that doesn't fit in the key, you will need to delve deeper. Poland (2020) is a good place to start, and in fact my key owes an enormous debt to that book. After that, you will need to consult more specialist works such as Cullen et al. (ed.) (2011) or Edwards and Marshall (eds.) (2019). Stace (2019) will not be a lot of help; inevitably the coverage there is partial and mostly restricted to those species that have established themselves properly in the wild.

A KEY TO GENERA DISCUSSED IN THE WORKSHOP

Leaves compound, lobed, spiny or toothed

Leaves compound (several leaflets)	Leaves palmate or with 3 leaflets					Choisya		
	Leaves pinnate, at least some with more than 3 leaflets					Mahonia		
Leaves simple (not composed of leaflets)	Leaves lobed					Quercus		
	Leaves obviously spiny, at least at apex	Leaves opposite				Osmanthus		
		Leaves alternate	Stems with groups of 1-7 spines				Berberis	
			Stems lacking spines	Twigs green or yellowish; leaves 3-10cm			Ilex	
		Twigs reddish; leaves 1-2cm			Gaultheria			
	Leaves toothed (sometimes finely and/or with spinulose teeth) or crenate but not lobed	Leaves ± opposite or whorled	Twigs with ridge or stipules extending between opposite leaf bases	Leaves with stellate hairs		Viburnum		
				Leaves glabrous	Twigs smooth, unridged	Aucuba		
			Twigs without ridge between leaf bases, leaves often subopposite or whorled		Stipules or stipule scars absent	Leaves alternate, subopposite or whorled		Osmanthus
				Leaves opposite		Pieris		
		Stipules or stipule scars present; leaves clearly opposite				Phillyrea		
		Leaves alternate	Branches usu. thorny, sometimes spiny at tips					Euonymus
			Branches not spiny or thorny	Leaves not white-felted	Leaves white-felted below			Pyracantha
					Twigs not stellate-hairy	Twigs stellate-hairy		
	Twigs glandular-hairy or bristly-hairy					Leaves aromatic, with clear or reddish glands below; buds in leaf-axils		Quercus
						Leaves odourless	Leaves hairless or with sparse orange hairs below; buds usu. above leaf-axils	
	Leaves always hairless; buds in leaf-axils						Gaultheria	
	Twigs hairy, non-glandular				Arbutus			
	Twigs hairless				Leaves net-veined; stipules or stipule-scars on twig			Rhamnus
		Leaves not net-veined; stipules or stipule scars near base of leaf-stalk			Prunus			
		Leaf margins entire				Photinia		
	<i>See next page...</i>							

Leaves simple, margins entire

Leaves alternate	Tree or tall shrub > 1.2m	Leaves with fimbriate (frilly) scales (lens)						Elaeagnus		
		Leaves with stellate hairs	Leaves grey or bluish below					Quercus		
			Leaves densely white or buff felted					Olearia		
		Leaves hairless, or with simple or non-stellate hairs	Leaves clearly net-veined	Stipules or stipule-scars present	Buds without bud-scales				[Cotoneaster]	
					Buds with 1-several overlapping bud-scales				Photinia	
				Stipules and stipule-scars absent	Twigs spiny				Berberis	
					Twigs spineless	Leaves usu. >8cm, ±whorled near tip of twig, sometimes with rust-coloured hairs on underside				Rhododendron
						Leaves usu. <9cm, never with rust-coloured hairs on underside	Leaves in lax whorl-like clusters near twig tips		Pittosporum	
			Leaves spaced along twigs	Twigs never pruinose, leaves bay-scented, acute at tip			Laurus			
				Twigs pruinose when young, leaves faintly odorous, rounded-acuminate at tip		Bupleurum				
			Leaves not, or weakly, net-veined	Leaves grey-felted below, crowded near tips of twigs					Pittosporum	
				Leaves hairless but with translucent glands					Skimmia	
				Leaves hairless but glistening-silvery					Atriplex	
		Leaves hairless, neither glandular nor silvery		Leaves broadly ovate or oblong, ±symmetrically rounded at base, shiny dark green or variegated above				Ilex		
	Leaves ±elliptic, wedge-shaped at base, shiny dark green above				Kalmia					
Leaves broadly ovate to orbicular, asymmetrically rounded at base, yellowish to mid-green or variegated above				Griselinia						
Low shrub usu. < 1.2m	Stipules or stipule-scars present					[Cotoneaster]				
	Stipules or stipule-scars absent					Daphne				
Leaves opposite, whorled or apparently whorled							See next page...			

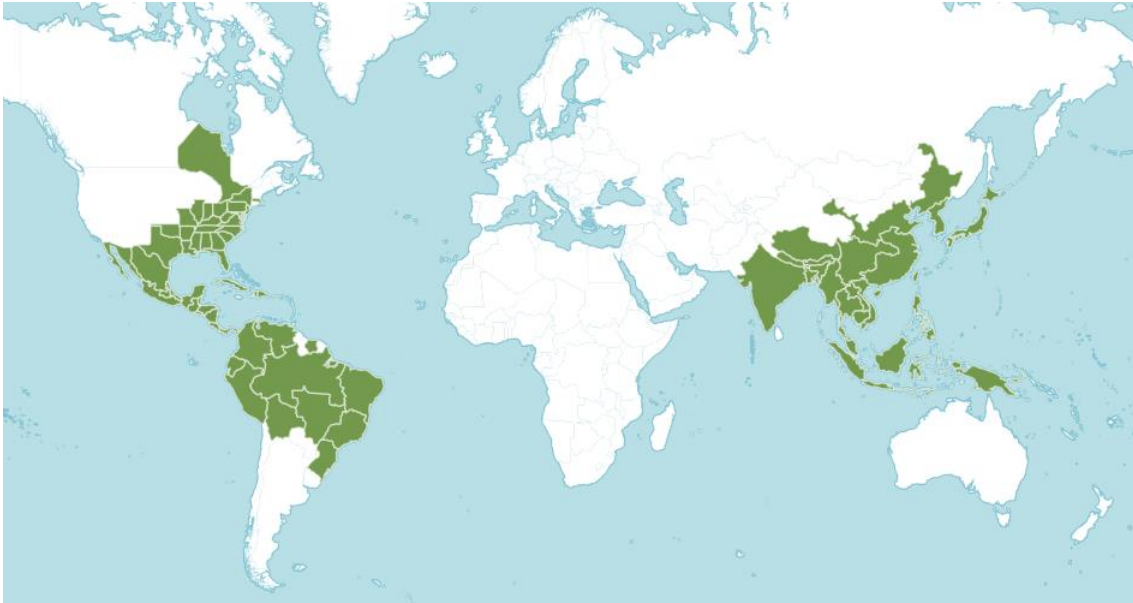
Leaves simple, opposite, whorled or apparently whorled, margins entire

Leaves opposite	Twigs with ridge or stipules extending between opposite leaf bases; leaves strictly opposite	Leaves with visible translucent secondary veins	Shoots, young leaves (especially on margins) and flowers covered in stellate hairs; leaves truncate or subcordate			Correa
			Leaves ± sessile (stalk < 0.4mm)			Kalmia
			Leaves with stalk > 0.6mm	Leaves >3cm long, usu. net-veined	Leaves with stellate woolly hairs below, strongly wrinkled; or hairless both sides except for vein axils, smooth	
		Leaves with silvery-silky hairs below			Olearia	
		Leaves with secondary veins obscure, opaque or absent	Leaves whitish-hairy below, yellow-glandular on midrib below, strongly aromatic			Olearia
	Leaves hairless, odourless			Veronica		
	Twigs without ridge between leaf bases	Leaves often subopposite, 1-3cm long, foetid; secondary veins straight, not looping			Buxus	
	Leaves opposite, at least some >3cm long, not foetid; secondary veins looping towards margins			Phillyrea		
Leaves whorled or apparently whorled	New leaf growth predominantly reddish or bronze			Pieris		
	New growth not reddish or bronze			Rhododendron		

MAGNOLIACEAE

Magnolia L. – Magnolias

This genus has over 200 species but only a handful are evergreen and cultivated in Britain. They are widely distributed in tropical and subtropical eastern Asia and the Americas.



The family is considered archaic, and the floral characters reflect this (no differentiation of petals and sepals, variable numbers of perianth segments spirally arranged). Buds are enclosed by stipule scales which fall off early leaving obvious scars. Leaves are alternate or clustered in false whorls towards the branch ends. They mostly have large entire very glossy stiff leaves that, as they age, tend to be convex each side of the midrib above and with somewhat recurved margins below. Secondary veins form a network extending right out to the edge of the leaf.



The most likely to be seen is *Magnolia grandiflora*, but only as a planted tree in gardens and parkland; it has many named cultivars. It lacks stipule scars on the leaf stalks, but some cultivars are hybrids and have small obscure scars at the base of the stalks. It has a felting of brownish hairs on the underside of the leaves that ranges from gingery to coppery to rufous in different cultivars. Other evergreen Magnolias in cultivation in Britain have conspicuous stipule scars at the base of the leaf stalks and their leaf undersides are yellowish, pale green or glaucous, but not brown-felted.



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LAURACEAE

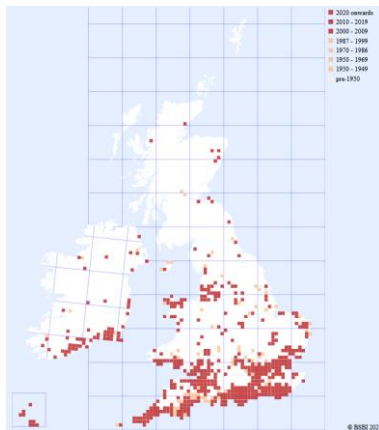
Laurus L. – Bays

This is another archaic family, but this is less obvious in its floral characters than in Magnolias. There are just three species of *Laurus*, and only one is generally found in Britain, that being the very familiar pot-herb *Laurus nobilis* (Bay) which is a plant of the Mediterranean, like its congeners. Its young twigs are hairless, whereas the other species (*L. azorica* and *L. canariensis*) have softly hairy young twigs. *L. nobilis* is now gaining a strong foothold especially in southern Britain and can often turn up (usually as individual plants) in woodland or hedgerows at a distance from houses, presumably bird-spread. It may prove to be invasive.



Leaves are alternate, entire, lack stipules and are often crinkled at the margins, with a characteristic aroma, broadly lanceolate, elliptical, ovate and glabrous on both sides. The midrib is often reddish-purple, primary veins are translucent and stand out clearly, and the secondary veining is net-forming, making a rather beautiful tessellation.

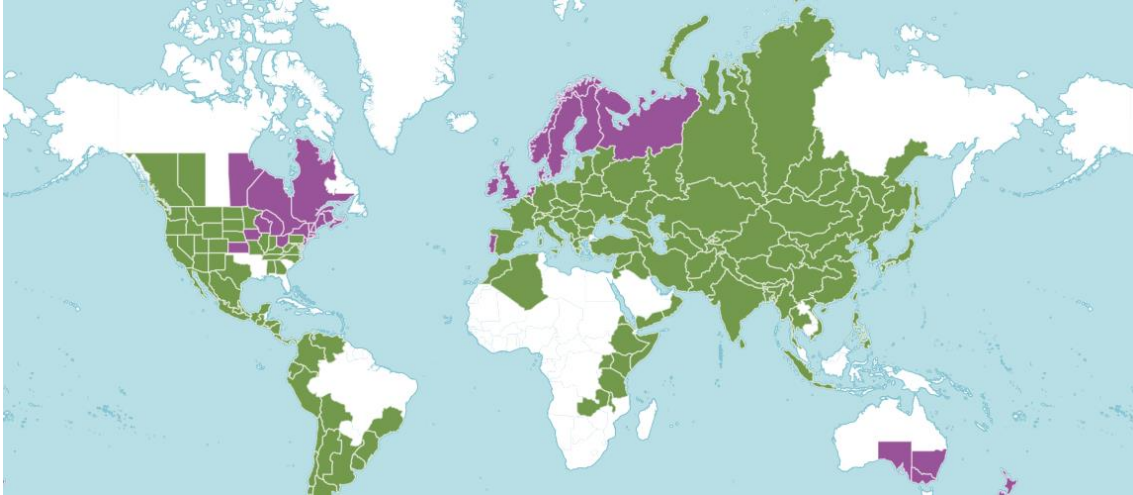
L. nobilis



BERBERIDACEAE

Berberis L. – Barberries

This genus of about 600 species includes at least a dozen species and hybrids that may crop up in the wild or self-establishing from plantings, although there are over 100 grown in gardens not counting hybrids and cultivars: if you need a guide to all of these, Cullen et al. (ed.) 2011 is the book, but identification of many is difficult. They have a wide distribution in temperate Eurasia and the Americas, and at higher altitudes in the tropics.



Berberis and Mahonia world distribution

We have only one doubtfully native species (*Berberis vulgaris*) and that is deciduous, so it is left out of this account. The key below includes both fully evergreen and semi-evergreen species and hybrids. (Semi-evergreens have a period of leaf-shed rather than doing it piecemeal through the year, but they retain leaves for two years so the plant is never bare.)

The wood of *Berberis* is yellow, and stems are spiny; stem spines can be simple or have up to 7 branches. Many evergreen species also have spiny leaves. Leaves are alternate and lack stipules. The illustrations in Stace (2019) are useful for the species covered.

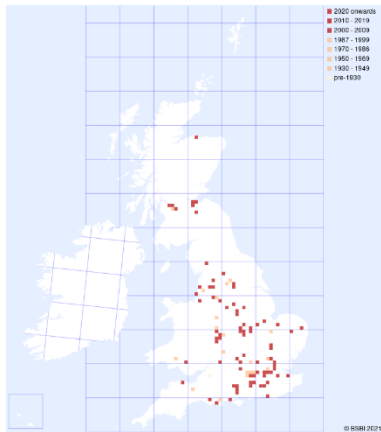
Evergreen Berberis key

Leaves with 6 or more teeth per side	Twigs round or bluntly angled, yellow or reddish	Leaves firmly leathery, undulate at margins, up to 11cm long	<i>B. gagnepainii</i>	
		Leaves thinly leathery, ±flat at margins, up to 7cm long	<i>B. manipurana</i>	
Leaves with 0-6 teeth per side	Twigs ±7-ridged, yellowish	Leaves with up to 10 spiny teeth each side, finely but obviously net-veined, up to 7cm long	<i>B. manipurana</i>	
		Leaves with up to 25 teeth per side, venation obscure, up to 11cm long	<i>B. julianae</i>	
	Leaves strongly net-veined	Spines all 3-partite, leaves glossy, not apiculate, sometimes with a few teeth each side	<i>B. aggregata</i> hybrids	
		Spines often simple near twig tip, leaves dull	Leaves entire, flowers in sparse bundles <i>B. wilsoniae</i>	
			Leaves with a few teeth, flowers in more dense bundles or short racemes <i>B. x rubrostilla</i>	
	Leaves not or weakly net-veined	Twigs rounded to slightly angled, leaves green below (if leaves white below, see Poland (2020) for rare garden plants)		<i>B. glaucocarpa</i>
			Leaves with strongly revolute margins, whitish below; flowers golden-yellow	<i>B. x stenophylla</i>
		Twigs 5-9-ridged	Leaves with flat or finely revolute margins, greenish below; flowers orange	Twigs densely brown hairy with hairs ≥0.5mm; stem spines 5-6-partite, up to 4mm long; leaves glossy, spine-tipped with 2-3 pairs of teeth near apex <i>B. darwinii</i>
			Twigs with minute hairs c. 0.1mm long; stem spines 3-5-partite, 8-15mm long; leaves dull, apiculate or shortly spine-tipped, usually untoothed otherwise <i>B. buxifolia</i>	

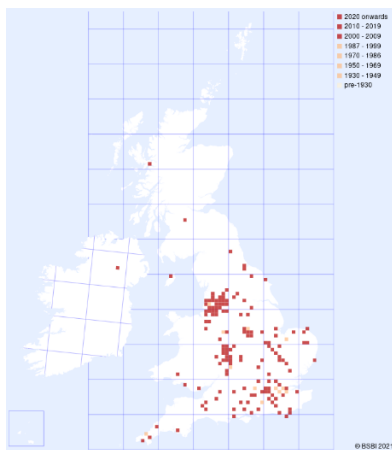
Floral characters

Flowers solitary	<i>B. buxifolia</i>
Flowers in clusters (short or no common stalk)	<i>B. gagnepainii</i> , <i>B. manipurana</i> , <i>B. julianae</i> , <i>B. aggregata</i> , <i>B. wilsoniae</i> , <i>B. x stenophylla</i>
Flowers in racemes (obvious common stalk)	<i>B. glaucocarpa</i> , <i>B. darwinii</i>
Flowers yellow (outer segments may be red)	<i>B. gagnepainii</i> , <i>B. manipurana</i> , <i>B. julianae</i> , <i>B. glaucocarpa</i> , <i>B. aggregata</i> , <i>B. wilsoniae</i> , <i>B. x rubrostilla</i> , <i>B. x stenophylla</i>
Flowers orange or yellow-orange	<i>B. buxifolia</i> , <i>B. darwinii</i>
Ripe fruit reddish or red	<i>B. wilsoniae</i> , <i>B. x rubrostilla</i> , <i>B. aggregata</i>
Ripe fruit blue, purple or black (sometimes with whitish bloom)	<i>B. gagnepainii</i> , <i>B. manipurana</i> , <i>B. julianae</i> , <i>B. glaucocarpa</i> , <i>B. buxifolia</i> , <i>B. x stenophylla</i> , <i>B. darwinii</i>

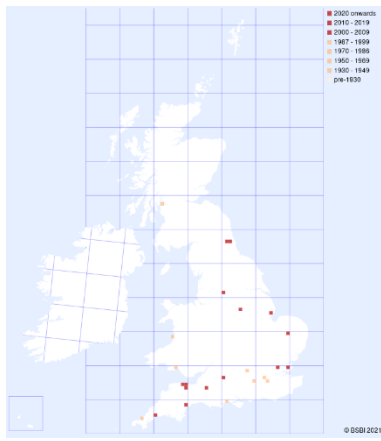
B. gagnepainii



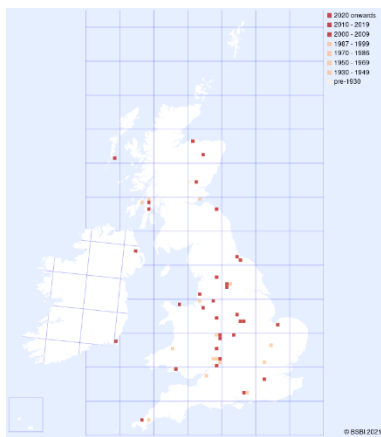
B. julianae



B. glaucocara

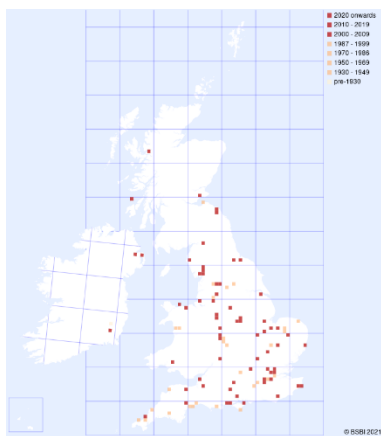


B. aggregata



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B. wilsoniae

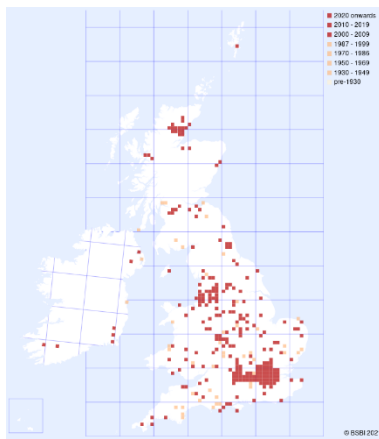


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B. x rubrostilla

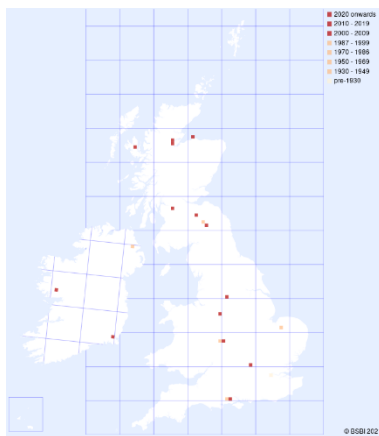


B. x stenophylla



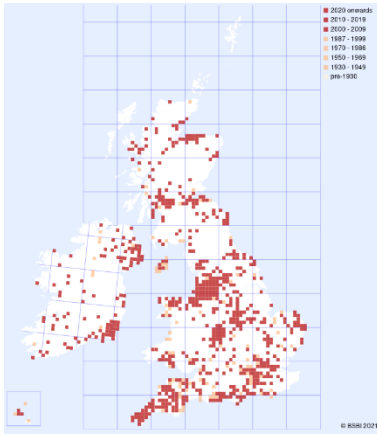
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B. buxifolia



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B. darwinii



Mahonia Nutt. – Oregon-grapes

This genus in the Barberry family differs from *Berberis* in having spineless stems and pinnate leaves – in fact, the only genus we deal with in this workshop with pinnate leaves. There are somewhere between 30 and 100 species recognised: that’s how debatable the taxonomy is at present. The key for this genus in Stace (2019) is rather confusing, as it does not differentiate all the taxa that are likely to be met with. In addition to those keyed below, many current garden plants that would key out as *Mahonia japonica* may be hybrids or cultivars of *M. sheridaniana* / *M. fargesii* / *M. oiwakensis* / *M. lomariifolia*: the taxonomy here is challenging.

Taxonomists have failed to agree whether the genus actually belongs within *Berberis* or deserves its independent status. It has centres of distribution in North America and eastern Asia.

Mahonia key

Leaves 30cm or more; inflorescences clusters of long (15-30cm), spreading to erect racemes	Leaflets 7-19; 4-19 marginal spines on each leaflet;		<i>M. japonica</i> or <i>M. sheridaniana</i>	
	Leaflets 15-25; 5-11 marginal spines on each leaflet		<i>M. x media</i>	
	Leaflets 25-41; 5-19 marginal spines on each leaflet		<i>M. oiwakensis</i> (inc. <i>M. lomariifolia</i>)	
Leaves up to 20cm; inflorescences short (3-racemes, often clustered)	Leaflets 9-15, crowded and often overlapping		<i>M. pinnata</i>	
	Leaflets 3-9, barely or not overlapping	Stems ascending or erect; leaves glossy or somewhat so above	Leaflets 3-9, bright glossy green above, not overlapping	<i>M. aquifolium</i>
			Leaflets 5-9, dull and scarcely glossy, slightly overlapping at times	<i>M. x wagneri</i>
		Stems sprawling, decumbent; leaves dull green	Leaflets ovate to oblong-lanceolate, with 16-22 teeth	<i>M. x decumbens</i>
			Leaflets rounded-ovate, with 16-40 teeth	<i>M. repens</i>

It is difficult to trust distribution maps at present, as taxonomic confusion casts many IDs in doubt. *M. aquifolium* shows as widespread on maps and *M. x wagneri* is rare, but the author has noted that many of the plants in his area fit the latter better.

The two main divisions in type of plant are illustrated on the next page.



Mahonia lomariifolia
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Mahonia x media



Mahonia aquifolium



Mahonia repens
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Mahonia x wagneri



BUXACEAE

This is a family of six genera, three of which have a restricted tropical or subtropical distribution and need not concern us here. Although they are not included in the general key, it is worth mentioning two of the others briefly, as they are both widely grown both in private gardens and in public mass plantings.

<p>±Prostrate plant; leaves spirally arranged, densest at branch tips, toothed</p>	<p><i>Pachysandra</i> (Carpet-boxes)</p>	<p>Most encountered species: <i>P. terminalis</i></p>
<p>Erect shrub; leaves alternate becoming subopposite towards branch tips, entire, acute at tip; flowers fragrant; fruit berry-like</p>	<p><i>Sarcococca</i></p>	<p>Most encountered species: <i>S. confusa</i> (garden origin), <i>S. hookeriana</i></p>
<p>Erect shrub; leaves opposite, entire, obtuse, rounded or retuse at tip; fruit a firm capsule with "horns"</p>	<p><i>Buxus</i> (Boxes)</p>	<p>Most encountered species: <i>B. sempervirens</i></p>



Pachysandra terminalis

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Sarcococca hookeriana

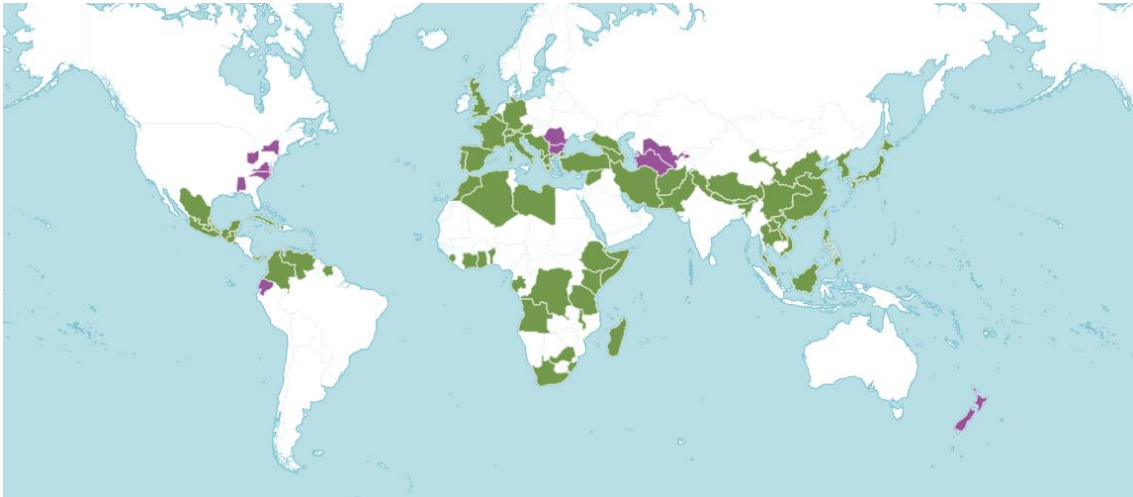


Buxus sempervirens

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Buxus L. - Boxes

Worldwide there are 100 species of Box, only one of which is considered native in Britain (and only in the south, although very widespread as a planting). They occur chiefly in subtropical, warm temperate and Mediterranean zones.



Buxus have shortly stalked opposite leaves and like the rest of the family, lack stipules. They have opposite, entire, glabrous or sparsely hairy leaves that are elliptical, ovate or ovate-oblong with a more or less obtuse or rounded apex in those species likely to be met with in Britain, and they have a distinctive smell. Twigs are four-angled, and green when young. The leaves have many crowded secondary veins. They are monoecious (bearing separate male and female flowers on the same plant): flowers are small and lack petals but have 4 sepals. The fruit has three cells and is distinctive in bearing three “horns” which are the remains of the persistent styles.

Buxus key

Leaves 3.5-5.5cm long, 3-5x as long as broad, usually yellowish-green; “horns” on capsule 4-5mm		<i>B. balearica</i>
Leaves 1.5-4cm long, 2-3x as long as broad; dark green or variegated above; “horns” on capsule 2-3mm	Leaves 1.2-2.5cm, elliptical or oblong	<i>B. sempervirens</i> f. <i>sempervirens</i>



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	Leaves up to 4cm, folded over in a “capsized longboat” shape, emarginate at tip	<i>B. sempervirens f. handsworthiensis</i>
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There are many other cultivars of *Buxus sempervirens*, and these can cause confusion.

ROSACEAE

This is a huge family, but thankfully only a few mainstream genera are of interest to us here. There are many evergreen species of Cotoneaster, but these are a difficult critical group and deserve a workshop of their own.

Prunus L. – Cherries (Laurels)

A genus with over 300 species, but only about seven evergreens are grown in European gardens, and of these only two are worth attention here. *P. lusitanica* (Portuguese Laurel) comes from south-west Europe; *P. laurocerasus* (Cherry Laurel) from the Balkans and south-west Asia. Both are spread by birds and occur quite commonly outside gardens and other plantings: *P. laurocerasus* is particularly common and is a serious invasive in vegetation.

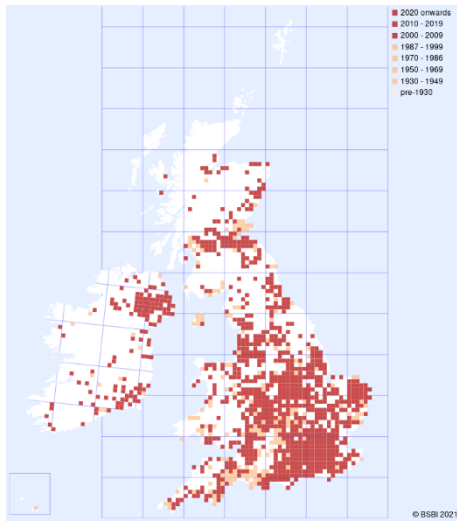
Leaves are alternate and stipulate, but the stipules soon drop and the scars may not be that obvious. More obvious is the presence of nectaries on leaf stalks and midribs, often persisting as brown circular scars.

Prunus key

First-year stems and leaf-stalks deep red; leaves obviously serrate; racemes mostly longer than leaves		<i>P. lusitanica</i>
First-year stems and leaf-stalks green; leaves obscurely crenate or serrate; racemes mostly shorter than leaves	Leaves 2.3-4.5cm wide	<i>P. laurocerasus</i> vars. <i>zabeliana</i> , <i>shipkaensis</i>
	Leaves 5-10cm wide	<i>P. laurocerasus</i> vars. <i>laurocerasus</i> , <i>magnoliifolia</i>

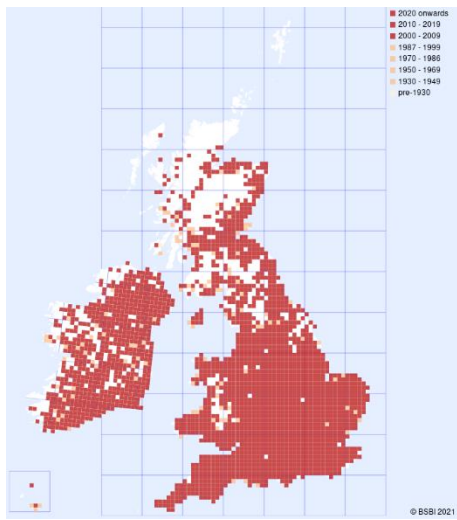
Both species are extremely popular hedging plants, often put in by developers because of their rapid growth; but they are high-maintenance, and *P. laurocerasus* in particular suppresses virtually all other vegetation if left to grow into thickets. I have split *P. laurocerasus* into a narrow-leaved group and a broad-leaved group, using the varietal names cited in Sell & Murrell (2014), because many people who are familiar with the older-established broad-leaved group may have trouble recognising the narrow-leaved as the same species when they meet them for the first time. But I have run Sell's varieties together because I have difficulty splitting the range of planted cultivars into four along the lines he gives.

P. lusitanica



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P. laurocerasus
vars. *zabeliana*,
schipkaensis



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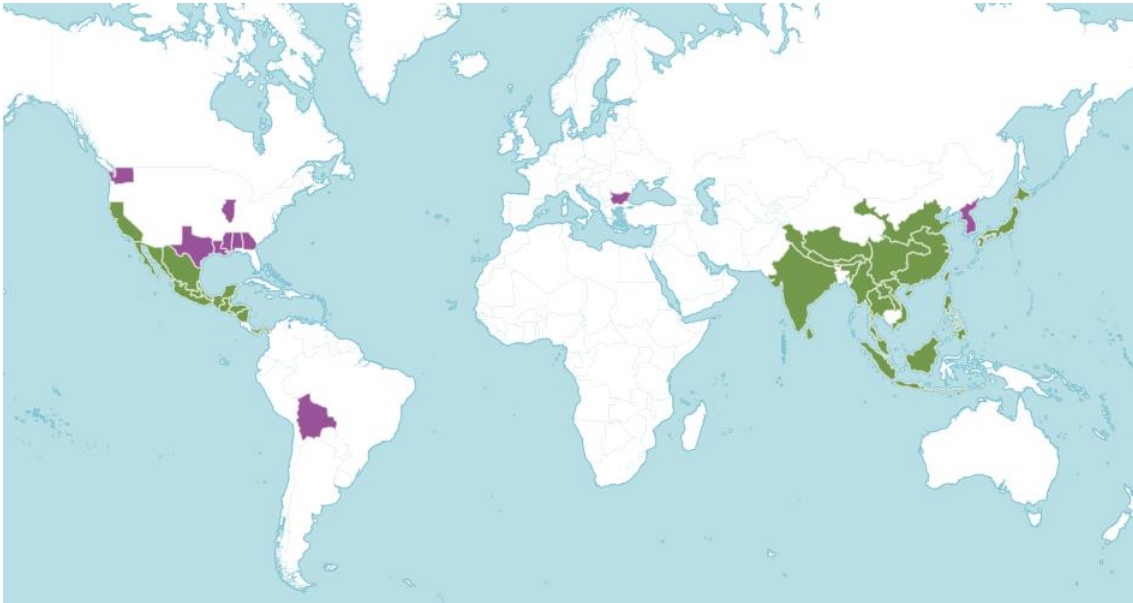
P. laurocerasus
vars.
laurocerasus,
magnoliifolia

P. laurocerasus



Photinia Lindl. – Stranvaesias

Photinia is a genus of under 40 species found in south-east Asia and central America as far north as California. About half are probably grown as garden plants, but many are frost-sensitive and we are concerned with only a couple that have turned up in the wild or are widely planted outside private gardens. These are extremely popular hedging plants, and *P. x fraseri* is often grown as a specimen shrub or small tree for its attractive young foliage. They produce berries and can be spread by birds. Distribution maps for the UK are probably misleading, as earlier ID books did not differentiate between these two.



Leaves alternate, entire or toothed, stipulate, elliptic to elliptic-obovate or oblong-lanceolate. *P. x fraseri* has become a very popular planting because of the rich red young leaf colouring in several of its cultivars. However, some other popular cultivars are hybrids of these two and will be difficult to determine.

Photinia key

Leaf oblong-lanceolate,
dull above, sometimes
reddish when young,
margins entire; carpels
and styles 5

P. davidiana



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<p>Leaf elliptic to obovate, rather glossy above, usually bright red when young, margins finely serrate; carpels and styles 2</p>	<p><i>P. x fraseri</i></p>
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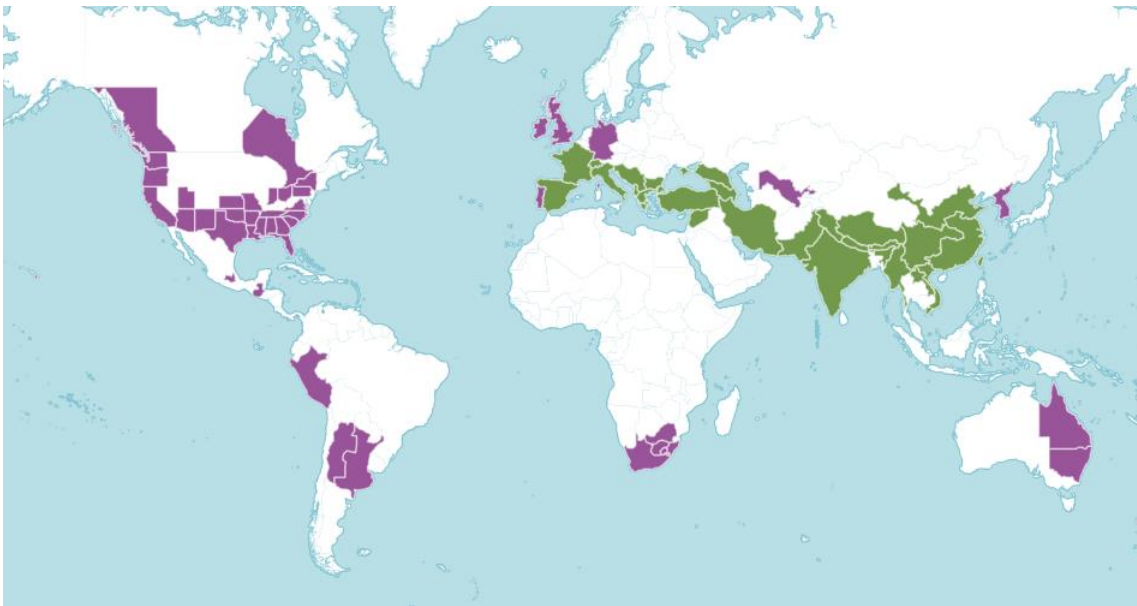


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Pyracantha M. Roem – Firethorns

This is a small genus of six species: some books (including Stace) mention *P. crenulata* and *P. crenatoserrata* among the species cultivated in Britain, but these are now considered as one under *P. crenulata*. *P. rogersiana* may also be consigned to *P. crenulata* if some taxonomists have their way. In the wild they are distributed in a band from the western Mediterranean to south-east Asia.



Spiny shrubs with simple alternate leaves; in the species we are covering, they are scalloped (crenate) or toothed. Leaves are stipulate but the stipules are tiny and drop early. In addition to the species in the key, the hybrid between *P. rogersiana* and *P. coccinea* is also cultivated and will confuse identification in some cases.

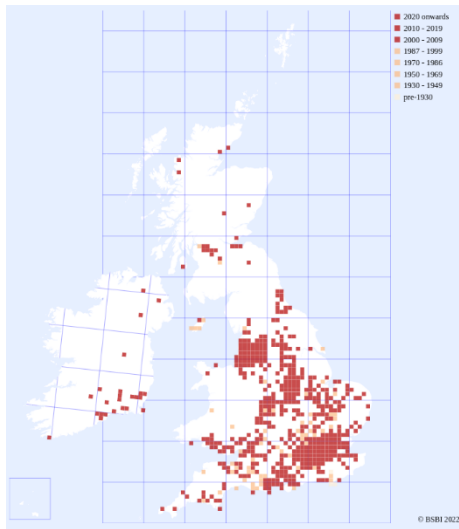
Pyracantha key

Young shoots and young leaf-stalks with rusty hairs; leaves elliptic, oblong or obovate (widest at or above the middle), margin scalloped to serrate; fruit orange to red	<i>P. crenulata</i>
Young shoots with greyish down; leaf-stalks hairy; leaves narrowly ovate-lanceolate (widest below middle), margin slightly scalloped to slightly serrate; fruit orange-red	<i>P. coccinea</i>
Young shoots hairy; leaf-stalks may be hairy at first but soon becoming glabrous; leaves narrowly oblanceolate (widest above the middle), margin shallowly and irregularly scalloped; fruit orange-red to yellow	<i>P. rogersiana</i>

P. crenulata



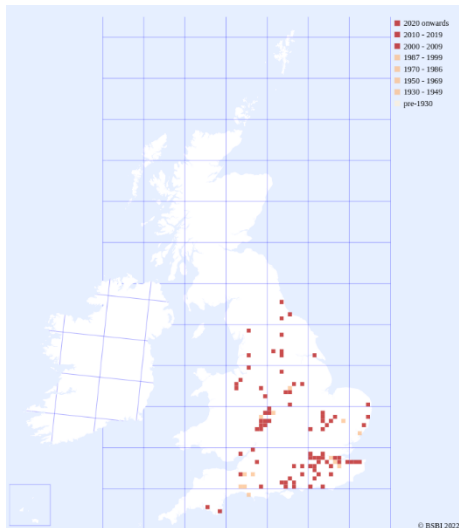
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P. coccinea



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P. rogersiana

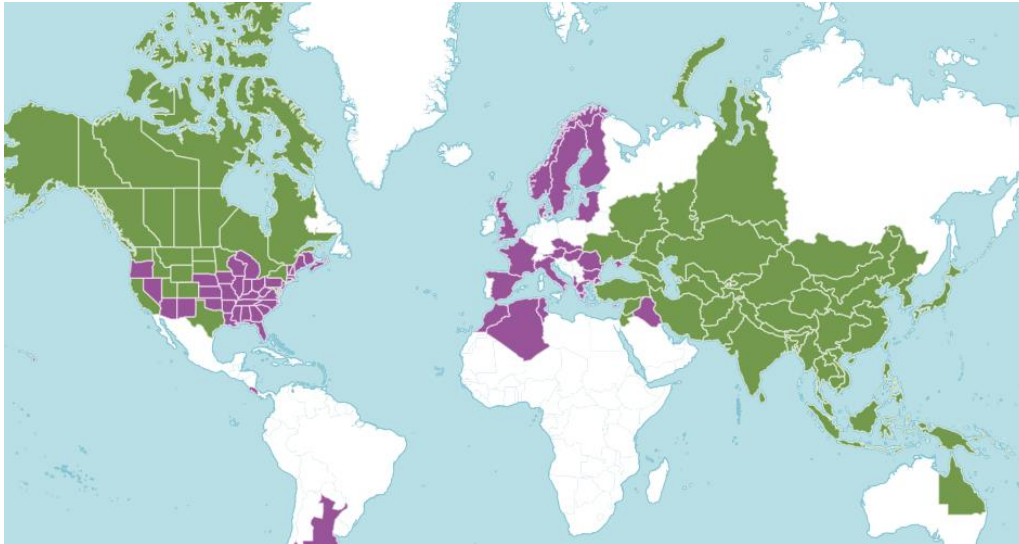


ELAEAGNACEAE

Elaeagnus Tourn. ex L. – Oleasters

This is a distinctive genus of nearly 100 species, distributed across much of North America, Asia and Australasia, but mostly from temperate Asia. Half a dozen are in general cultivation here; of these, three species and a couple of hybrids are evergreen.

These evergreens, including the cultivars derived from them, are very commonly grown both in private gardens and plantings in public places, often incorporated into hedging. The four-lobed whitish flowers, mostly produced in winter, have a delicious scent. They produce berries attractive to birds and can spread into the wild but are more often seen as relics of planting.



The young branches have dense brown scales, roughly circular and ranging from frilly to almost star-like (stellate). Leaves are alternate, entire, and more or less short-stalked. Much of the underside is silvery with variable numbers of brown scales; there may also be a scattering of whitish-translucent scales along the midrib and surface of the glossy upper side.

Elaeagnus key

Scrambling shrub with whippy shoots; leaves 4-7 x 1.5-3.5cm, with brown shining scales beneath, margins not wavy	Thorns lacking		<i>E. glabra</i>
	With a few thorns		<i>E. x reflexa</i> (<i>E. glabra</i> x <i>pungens</i>)
Stiff-branched shrub, leaves predominantly silvery or whitish beneath, often with some brown scales	Leaves broadly ovate to almost circular, ±acuminate, with a thin white margin visible from above, undersides silvery and any brown scales mostly confined to midrib		<i>E. macrophylla</i>
	Leaves elliptic, oblong or ovate, blunt or gradually tapered to a point; often a scattering of brown scales on underside surface as well as on midrib	Shoots usually with scattered thorns; leaves oblong or ovate, with strongly wavy or crinkly margins and no thin white margin visible from above; midrib with dense brown scales	<i>E. pungens</i>
		Shoots thornless; leaves elliptic, with ±wavy edges but not crinkly, usually lacking an obvious white margin seen from above; midrib with frequent to scattered brown scales	<i>E. x submacrophylla</i> (<i>E. macrophylla</i> x <i>pungens</i>)

Difficulties with ID can arise from the hybrids, particularly *E. x submacrophylla* which is very commonly planted and varies widely across the spectrum between the two parents. There also appear to be thornless cultivars of *E. pungens*. Suburban areas and modern industrial / trading estates can be happy hunting grounds for all these apart from *E. glabra* (which appears to be rare), often in variegated forms.

E. pungens 'Maculata'



E. x submacrophylla

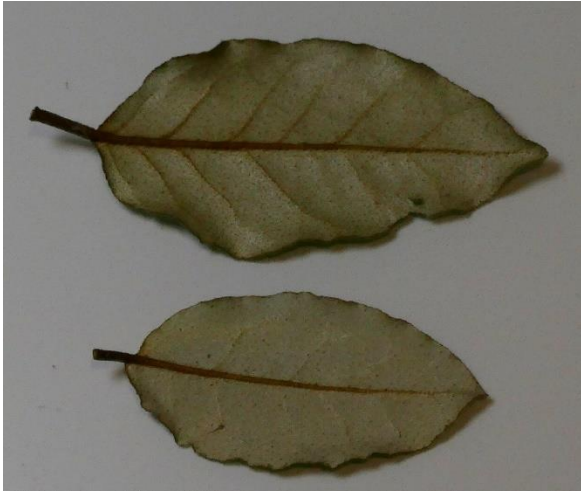


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E. macrophylla



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E. pungens

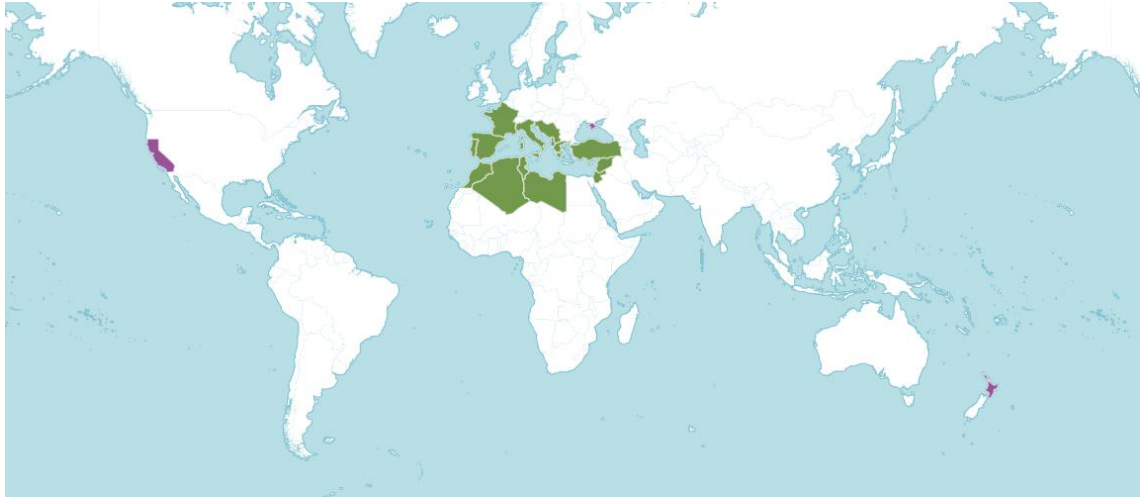


E. x submacrophylla but close to *E. macrophylla*: notice few brown scales beneath, silver margin seen from above, acuminate tip

RHAMNACEAE

Rhamnus L. – Buckthorns

About 130 species (taking a fairly conservative view of it) distributed through North America, South America, Europe, Asia and Africa. There are a dozen or so in cultivation in Europe; we have one native (deciduous, *Rhamnus cathartica*, Purging Buckthorn) and one established escape which is an evergreen.



Rhamnus alaternus world distribution

Leaves alternate, simple, stalked, with stipules. Fruit a black berry.

Bark grey or brown;
leaves ovate to oblong, 3-
6 x 2-3cm wide, tapered
at base, acuminate at tip,
margins thickened,
toothed or sometimes
entire, with 3 veins at
base and up to 6 pairs all
told; fruit 4-6mm,
obovoid, with 2-3 seeds

R. alaternus



R. alaternus is a Mediterranean species that seems to survive well in coastal areas in Britain, although rarely recorded.



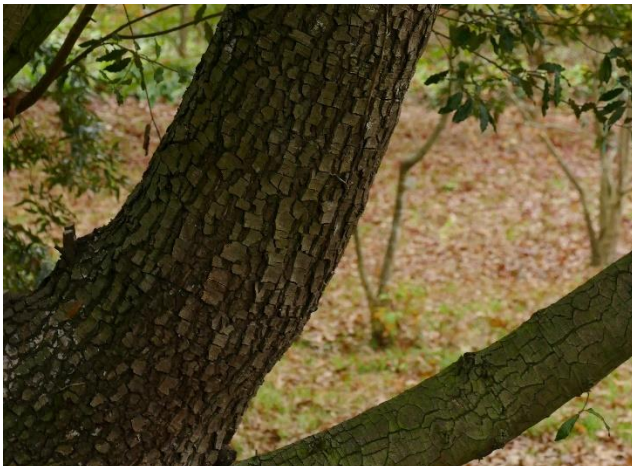

FAGACEAE

Quercus L. – Oaks

Oaks form a large genus of over 450 species worldwide, widely distributed but absent from much of South America, Africa (other than the north) and Australasia. Over 50 are listed in cultivation in Europe of which 13 are evergreen, and of those, just two are found other than as rare plantings in collections; several hybrids are semi-evergreen, dropping their leaves in the spring after they formed.

Leaves alternate, with stipules at least when young, variable in shape, toothed and usually with spines on teeth.

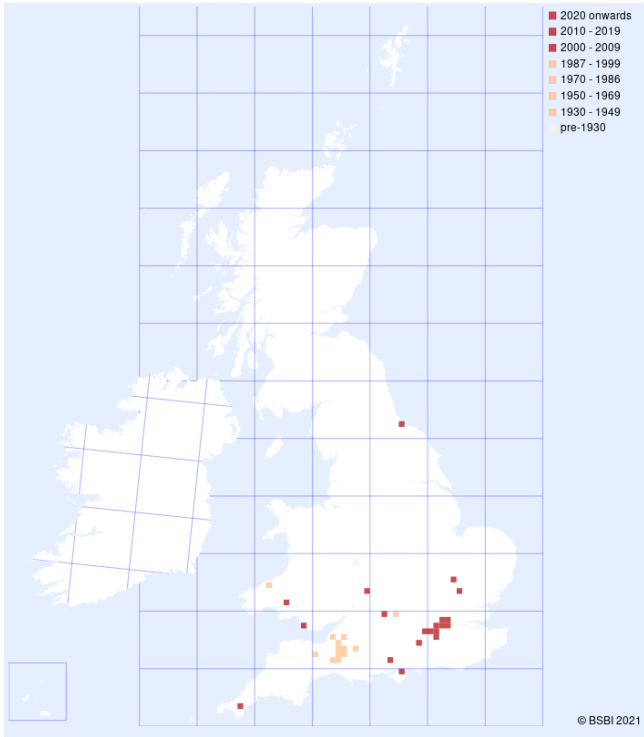
Quercus key

<p>Bark corky, greyish brown, fissuring deeply as it ages, showing red-brown beneath; leaves with up to 6(7) pairs of veins; acorn cups with long spreading scales</p>	<p><i>Q. suber</i></p>		
<p>Bark hard, dark grey, splitting into small "tiles" as it ages; leaves with 5-10 pairs of lateral veins; acorn cups with appressed scales</p>	<p><i>Q. ilex</i></p>		

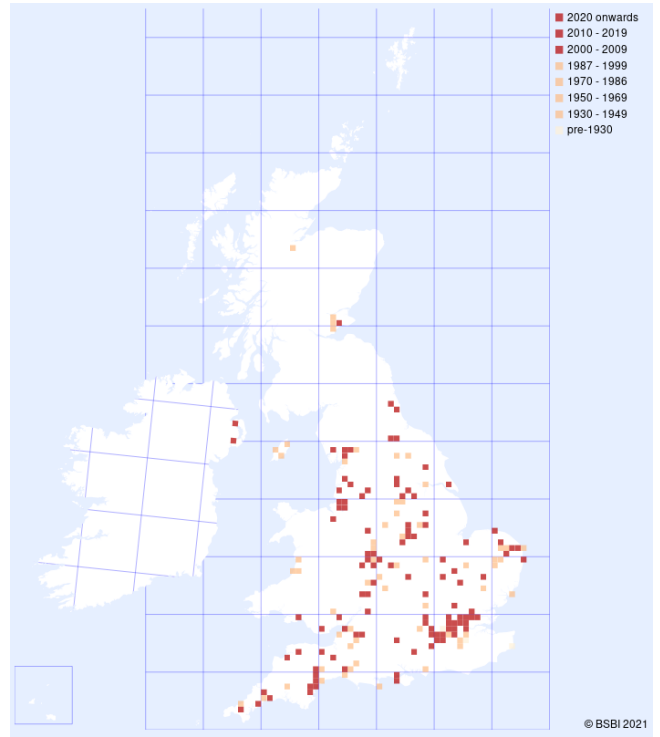
For the present you are unlikely to see *Quercus suber* (Cork Oak) outside a garden planting, but *Q. ilex* (Holm Oak) is widely naturalised and in the South can be highly invasive. Leaf shape and spininess of the latter can be very variable.

Q. suber hybridises with the deciduous non-native *Q. cerris* (Turkey Oak) to produce the semi-deciduous *Q. x crenata* (Lucombe Oak); it has lobed leaves and buds with long narrow persistent stipules like *Q. cerris*, and the spiky-looking acorn cups of *Q. suber*. The lobes can have small spines. It was originally planted in parks but has established itself in several parts of southern Britain.

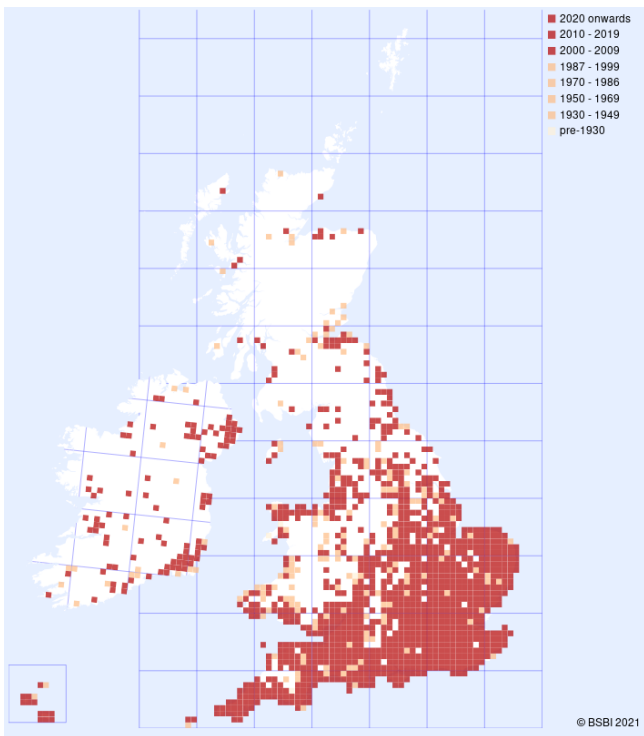
Q. ilex hybridises with the deciduous native *Q. robur* (Pedunculate Oak) to produce the semi-deciduous *Q. x turneri* (Turner's Oak). This tends to lose leaves more readily over winter than *Q. x crenata*. It does not have persistent long bud stipules, and the leaves are shallowly lobed or toothed, sometimes with small spines especially towards the leaf tip. The acorn cups have downy scales. It cannot reproduce itself from seed and all trees are grafts from the original hybrid stock.



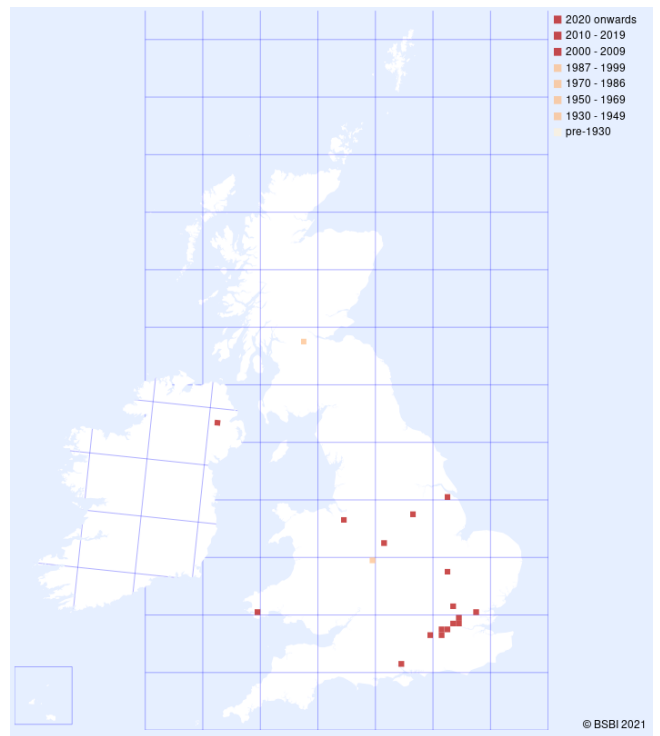
Quercus suber



Quercus x crenata



Quercus ilex

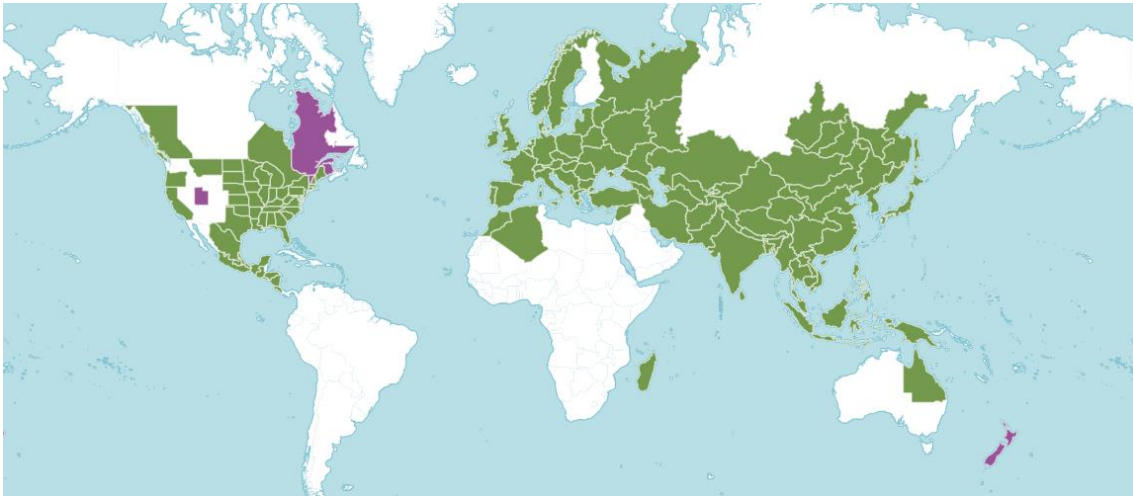


Quercus x turneri

CELASTRACEAE

Euonymus L. – Spindles

Spindles have about 140 species widely distributed through North America, Europe and other parts of the Mediterranean, and Asia. In Britain we just one native species (*Euonymus europaeus*). A couple of dozen are regularly grown horticulturally in Europe, and of these 11 are evergreen or semi-evergreen. Only a couple are widely planted in Britain, and these are dealt with here.



Leaves opposite, simple, stalked, with small stipules. All species have a fruit similar to our native species, with a pinkish-red or white capsule and the seeds within it with an orange coating (the aril); but it can be tricky finding fruits on some of the introduced species in some seasons, or where they are cut for hedging. Most have 4 lobes, some have 5.

Euonymus key

Low shrub with stems spreading and often layering at the base; bark rough; leaves not very glossy above, often variegated, shallowly but sharply crenate-serrate

E. fortunei



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<p>Shrub or small tree, not layering; bark smooth; leaves glossy above, sometimes variegated, finely and bluntly crenate-serrate</p>	<p><i>E. japonicus</i></p>
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Both species are very popular for suburban hedging and for planting schemes, and may be naturalised particularly near the coast.

RUTACEAE

Choisya Kunth – Mexican Orange

This genus includes 6 species worldwide, found in the southern United States and Mexico. Only two species and their hybrid are likely to be seen in gardens in Britain, and they are the only plants with compound palmate leaflets that we are dealing with. All can be frost-sensitive but *C. ternata* is the least so and the most widely planted.



Leaves opposite, palmate with 3-7 leaflets. The flowers are fragrant, and a second flowering can occur in late autumn.

Choisya key

<p>Leaves with 3 leaflets; leaflets oblong to obovate, without warty glands, up to 3cm wide; flowers in loose panicles</p>	<p><i>C. ternata</i></p>	A close-up photograph of the plant <i>Choisya ternata</i> . It shows several bright green, opposite, palmately compound leaves with three leaflets. In the center, there is a cluster of small, developing flower buds.	<p>©Dinkum Licence Creative Commons CC0 1.0</p>
<p>Leaves with up to 15 leaflets; leaflets linear to narrowly elliptical, with or without warty glands; flowers sometimes solitary</p>	<p><i>C. x dewitteana</i></p>	A photograph of the hybrid <i>Choisya x dewitteana</i> . The image shows a branch with several small, white, five-petaled flowers with yellow centers. The leaves are narrow and linear, with some showing small, raised glands.	<p>© A. Barra Licence GNU Free Documentation License, Version 1.2</p>

Leaves with up to 15 leaflets;
leaflets linear, up to 5mm broad,
with warty glands

C. dumosa



© A. Harris

Correa Andrews – Tasmanian Fuchsia

A small genus with 11 species native to Australia. Most are cultivated in Europe but several species are tender and only one is likely to be found in the wild in Britain, and that only in the far south-west.

Leaves opposite, simple, usually entire, covered with stellate hairs when young, as are the young shoots. Flowers have attractive long-tubed corollas with 4 lobes.

Leaves dark green, ovate to elliptic, truncate to subcordate at base, with white stellate hairs on upperside and margin when young, and pale rusty or grey felting below; flowers creamy- or yellowy-green

C. backhouseana



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Skimmia Thunberg – Skimmias

An Asian genus of half a dozen species. Three species are grown in Europe, along with one hybrid. One species and the hybrid are extremely popular plantings in Britain for private gardens, amenity plantings and ground cover, but the hybrid may often be recorded as *S. japonica*. Occasional escapes are recorded.



Leaves alternate, clustered near the growing tips of shoots, simple, entire or feebly scalloped near the tip, and without stipules. Leaves are dotted with translucent glands. Flowers are produced in shortly cylindrical, pyramidal or globose panicles and are hermaphrodite or unisexual.

Skimmia key

Leaves slightly aromatic when rubbed, with 4-8(-11) pairs of rather obscure veins, stalks green or reddish; flowers usually very sweetly scented, flower parts in 4s or 5s; fruit red		<i>S. japonica</i>	
Leaves strongly aromatic when rubbed, with 7-20 pairs of obscure veins stalks green or brownish; flowers sweetly scented or not; fruit orange, red or black	Flower parts sometimes in 4s, usually in 5s; fruit red		<i>S. x confusa</i>
	Flower parts always in 5s	Leaves with up to 20 pairs of veins, stalks up to 3.2cm; flowers sweetly scented at first; fruit black	<i>S. laureola</i>
		Leaves with up to 15 pairs of veins, stalks up to 1.3cm; flowers unpleasantly scented; fruit orange or red	<i>S. anquetilia</i>



S. japonica



S. x confusa 'Kew Green'



S. laureola

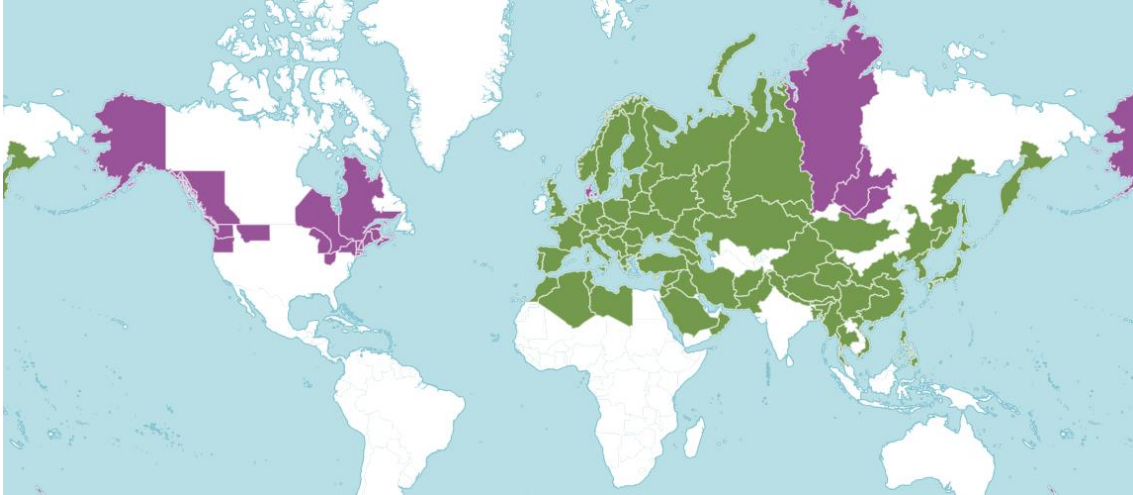


S. anquetilia

THYMELEACEAE

Daphne L. – Mezereons

A genus of nearly 100 species found in Europe, North Africa and much of Asia. About a quarter of these, and several hybrids, are grown in Europe; and 16 are native to Europe, of which we have just two as natives. Most of the horticultural species and hybrids are rarely found self-establishing from seed, but a number of the most common are dealt with here as they can turn up occasionally as outcasts.



Leaves are alternate, entire, short-stalked or sessile and stipules are absent. Flowers lack petals but the sepals are often coloured, fused at the base and with four lobes. Many are richly scented.

Daphne key

Daphne key				
Flowers greenish				<i>D. laureola</i>
Flowers white, pink or purplish	±Prostrate, trailing sub-shrubs			<i>D. cneorum</i>
		Leaves 4-10cm; fruit may be present	Leaves oblanceolate to narrowly ovate, flat, often variegated; winter-flowering, powerfully scented; fruit red	<i>D. odora</i>
	Leaves narrowly elliptic to oblanceolate, usually with wavy margins; flowering winter-spring, scented; fruit black		<i>D. bholua</i>	
	Erect shrubs	Leaves up to 4cm; fruit unknown	Leaves fully evergreen, decidedly leathery, notched at apex; flowers in isolated terminal clusters; calyx tube up to 7mm, lobes acute	<i>D. x mantensiana</i>
			Leaves semi-evergreen, not very leathery, mucronate to obtuse at apex; flowers in clusters crowded on terminal branchlets; calyx tube c. 10mm, lobes obtuse and/or mucronate	<i>D. x burkwoodii</i>

D. laureola



D. cneorum



D. odora



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D. bholua



D. x mantensiana



Courtesy Youngblood Nursery Inc.

D. x burkwoodii



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AMARANTHACEAE

Atriplex L. – Oraches

A genus of around 250 species worldwide, found in most regions except for polar areas and some tropical forest regions. We tend to think of them as weedy annuals, but the genus contains shrubby species, particularly the Saltbushes found in arid parts of several continents, notably western North America and Australia. Only one species has naturalised in Britain, where it is mostly found on the coast.

Shrub up to 2m, young shoots pale and mealy; leaves alternate. without stipules, blades 1-4cm long, silvery-mealy with glands, ovate or deltate with lobes or teeth, broadly wedge-shaped at base, stalk up to 1cm; flowers and often individual bushes unisexual

A. halimus

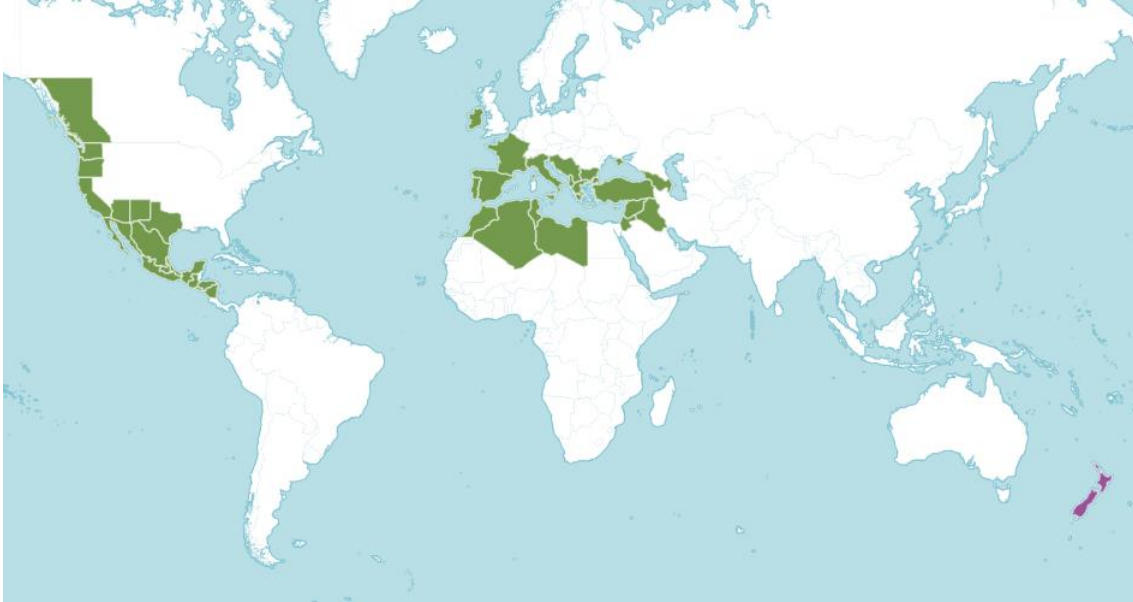


ERICACEAE

A large and diverse family with a world-wide distribution, the family includes some large and challenging genera. This account leaves out most sub-shrubs and narrow-leaved plants. Stipules are absent. In the genera we are concerned leaves are alternate or occasionally whorled or opposite, but can form “pseudo-whorls” of crowded groups at the tips of branches.

Arbutus L. – Strawberry-trees

A small genus of trees and shrubs, with 9 species found in the Americas, Canaries and Europe. One (*Arbutus unedo*) is native in SW Ireland and naturalised elsewhere in Britain, usually on sheltered slopes.



The fruit, like a globular unpeeled lychee, is characteristic of the genus. Four other species are said to be cultivated in Britain but they are all frost-sensitive to a degree, and the most widely planted is a hybrid. Here we deal with the naturalised species and its hybrid with a species of SE Europe.

Arbutus key

Bark dark reddish-brown, fissuring with rectangular flakes; young shoots densely covered with short glandular hairs. Leaves $>3x$ as long as broad. Panicles pendent.

A. unedo



Bark orangey-red, peeling in strips to reveal red, orange or yellowish smooth underbark; young shoots with sparse glandular hairs at most. Leaves usually $\leq 3x$ as long as wide. Panicles variable, erect to patent or somewhat drooping.

A. x andrachnoides



Rhododendron L. – Rhododendrons

This is a big genus of over 1000 species, mostly in temperate regions. More than 300 species are in cultivation and around 20,000 cultivars have been named. There is little point in trying to deal with them thoroughly in these notes, even when limiting coverage to the larger evergreen species. However, there is one small group that is worth coverage as it includes some of those most commonly found in the wild, and they present a taxonomic problem. The most widespread species, *R. ponticum*, is a Mediterranean species with two geographic races. But it has been crossed with several other related North American species (probably most commonly with *R. catawbiense*); the hybrids are fertile and may be introgressed. *R. ponticum* is also used as a grafting stock for an even wider range of related species. The following key gives the details of the putative parents and the hybrid aggregate. These plants all have leaves at least 6cm long and often much longer, $\geq 2x$ or more as long as broad, and corollas ranging from white to deep magenta or purple and with faint or yellowish spots. It is doubtful whether the hairiness of the leaf undersides is a good diagnostic character as given in Stace (2019), as most plants lose obvious hairs when mature and even *R. ponticum* can have some hairs when young. The key excludes all those species in the Subsection that are persistently woolly-hairy or felted underneath.

Rhododendron Subsection Pontica: a partial key

Ovary hairless				<i>R. ponticum</i>	
Ovary hairy	Ovary and flower stalks with glands	Leaf undersides hairy when young, sometimes retaining hair bases at maturity; calyx usually ≤ 3.5 mm		<i>R. x superponticum</i>	
		Leaf undersides downy / scurfy when young, sometimes retaining this at leaf base when mature; calyx ≥ 3.5 mm		<i>R. maximum</i>	
	Ovary and flower stalks without glands	Ovary cylindrical-conical, often truncate at apex, surface not entirely obscured by hairs		<i>R. x superponticum</i>	
		Ovary rounded, not truncate at apex, surface obscured by hairs	Leaves 1.8-2.3x as long as broad, rounded and \pm acuminate at apex, rounded at base, corolla pink to lilac-purple	<i>R. catawbiense</i>	
			Leaves $>2.3x$ as long as broad, corolla white to pink	Leaf apex acute to acuminate, base wedge-shaped; corolla 3-4cm	<i>R. macrophyllum</i>
				Leaf rounded at apex and base; corolla ≤ 2.5 cm	<i>R. brachycarpum</i>

R. maximum



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R. catawbiense



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R. macrophyllum



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R. brachycarpum



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R. ponticum



The hairless undersides of R. ponticum leaves

Kalmia L. – Sheep-laurels

Kalmia has one British native species, *K. procumbens* (Trailing Azalea), which is a low-growing trailing montane subshrub, lacks the corolla pouches and used to be classified as *Loiseleuria*. The other seven species are shrubs and small trees; those cultivated in Europe come from North America. Three species are widely grown and are naturalised sparsely in Britain.



Apart from the foliage differences, *Kalmia* are distinguished by their flowers; petals may be fused for a greater length at the base, and in all but one species the corolla has 10 pouches at the base containing the anthers while still in bud. *Rhododendron*, although its flowers are funnel- or bell-shaped, has petals usually less fused at the base and lacks pouches.

Kalmia key

Leaves mostly alternate, 50-100 x 20-40mm, narrowly acute at tip, yellowish or reddish on underside, with strongly revolute margins; inflorescence apparently terminal; flowers 20-25mm across		<i>K. latifolia</i>
Leaves mostly opposite or in whorls of 3, ≤20mm wide, obtuse to bluntly acute at tip; flowers ≤ 20mm	Shrub to 150cm; leaves to 60 x 20mm, stalks 4-8 mm, margins flat or slightly revolute, pale green on underside; Inflorescence overtopped by new season's shoot and apparently lateral	<i>K. angustifolia</i>
	Dwarf shrub to 50cm; leaves to 35 x 12mm, sessile, margins revolute, whitish on underside; inflorescence apparently terminal	<i>K. polifolia</i>

K. latifolia



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K. angustifolia



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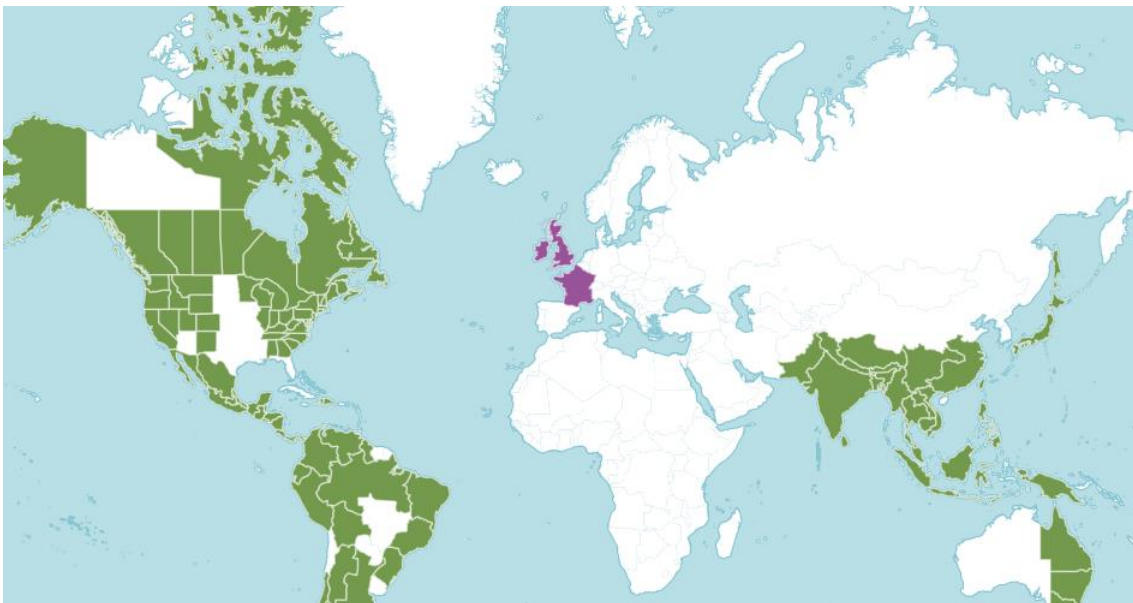
K. polifolia



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Gaultheria L. – Shallons

Gaultheria is a genus of about 150 species distributed across the Americas, eastern Asia and Australasia; all are evergreen. Over 40 of these are in cultivation in Europe, but only three species and a hybrid are of much concern to us: of these, one species and the hybrid are rare as escapes, one is widespread and certainly to be monitored, and one is aggressively invasive on ungrazed heathland and in open woodland on acid soils. Plants escaped to the wild are usually found on heathland, moorland and open woodland.



Many species are procumbent and even the erect shrubs found here will not usually exceed 2 metres. Those found in the wild in Britain have leathery alternate, ovate, elliptic or obovate finely toothed leaves, with solitary flowers or panicles; flowers are fairly small (up to 10mm), urn-shaped like those of *Erica* and *Arbutus* in the following taxa.

Gaultheria key

Erect shrub to 2m (but often low-growing on heathland); leaves up to 13cm, acuminate but not hard-tipped, rounded to cordate at base; flowers in axillary racemes near ends of stems; corolla \geq 7mm, pink or occasionally white	<i>G. shallon</i>	
Erect or sprawling shrub to 1.5m; leaves < 5cm, with terminal spine or hard acute tip, tapered to truncate at base	Leaves consistently <2cm, spine-tipped; flowers single or in few-flowered racemes in leaf-axils; corolla 2-5mm, white to pink	<i>G. mucronata</i>
	Leaves usually >2cm and up to 4.5cm, sharply acute to spine-tipped; flowers mostly in axillary racemes; corolla 4-7mm, white or pink (hybrid between the two preceding species)	<i>G. x wisleyensis</i>
Low-growing undershrub with shoots to 15cm; leaves \leq 5cm, obtuse to rounded at tip, tapered at base; flowers solitary in leaf axils; corolla 5-10mm, white or flushed pink	<i>G. procumbens</i>	

G. shallon



G. x wisleyensis



G. mucronata

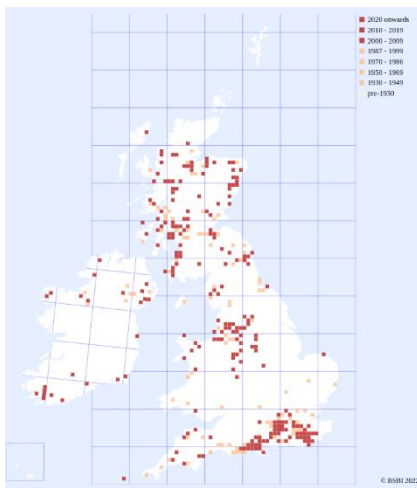


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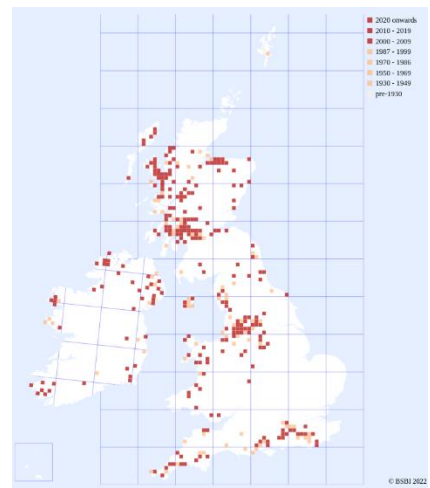
G. procumbens



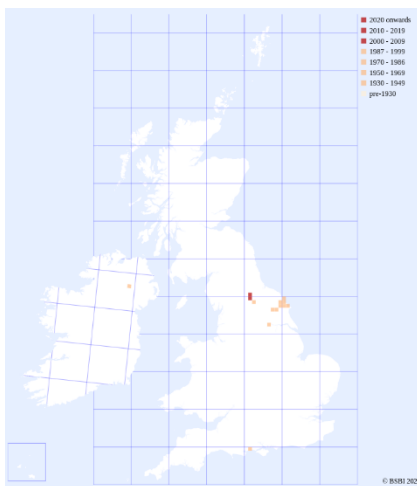
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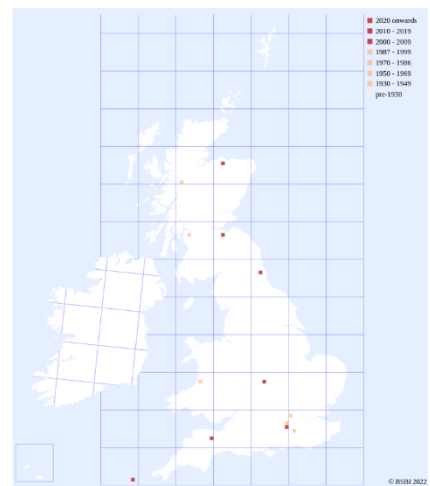
Gaultheria shallon



Gaultheria mucronata



Gaultheria x wisleyensis



Gaultheria procumbens

Pieris D. Don - Pieris

This is a small genus of seven species from eastern Asia, the eastern US and Caribbean. Five are in cultivation; this account leaves out one of those which is a dwarf sub-shrub with leaves opposite or in whorls of 3. Of the others, three are popular garden plants, and the two most popular (*P. formosa* and *P. japonica*) have many cultivars, which make it difficult to identify species on habit, size, leaf dimensions and colouring. They are grown mostly for their striking red or bronze young foliage.



Flowers are in racemes or panicles, urn-shaped or cylindrical and often fragrant.

Pieris key

Stems and leaf stalks covered in stiff appressed hairs; leaf teeth ending in conspicuous hairs; corolla with 5 strong ribs and alternating pouches		<i>P. floribunda</i>
Leaf stalks not bristly; leaf tooting fine and without terminating long hairs; corolla at most weakly ridged	Leaf margins entire or shallowly toothed mostly towards tip; corolla weakly 5-ridged	<i>P. japonica</i>
	Leaves finely toothed around most of margin; corolla unridged	<i>P. formosa</i>

P. japonica



A dwarf cultivar of *P. japonica*, probably 'White Rim'



P. formosa



Pieris formosa var.
?forrestii



P. floribunda
(appressed marginal
leaf hairs not very
obvious!)



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P. floribunda stem
hairs



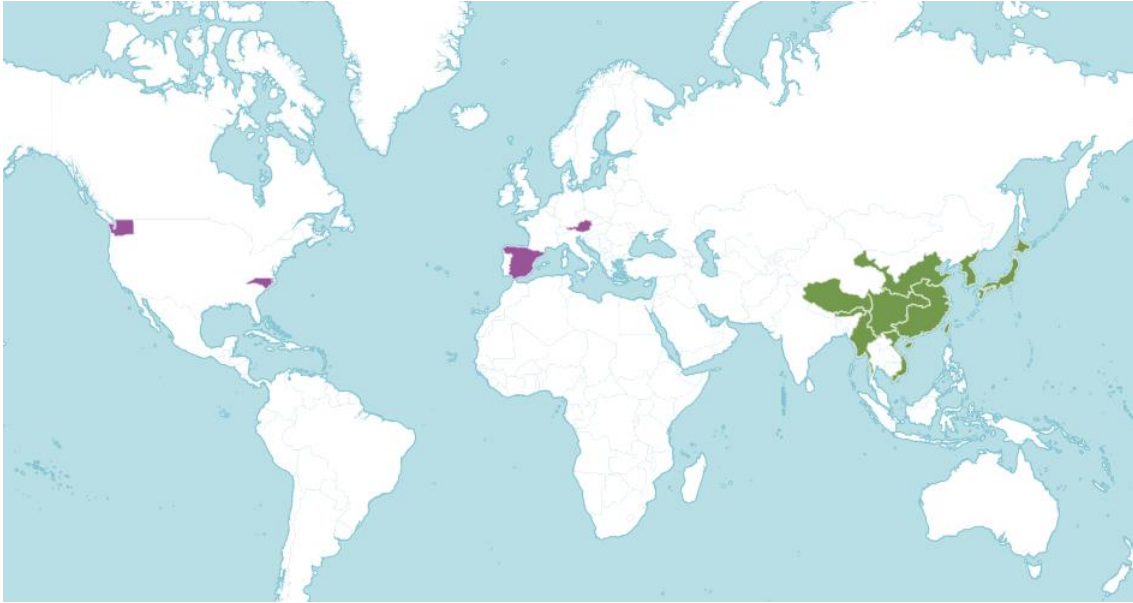
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GARRYACEAE

This family includes two genera of interest, which used to be assigned to families of their own. They are shrubs or small trees with opposite leaves, entire or serrate at the tips, and lack stipules. They are dioecious, bearing 4-merous male and female flowers on separate plants; females bear berry fruits.

Aucuba Thunb. – Spotted-laurels

There are ten species of these shrubs in Asia, several of which are in cultivation, but only one is popular enough to have found its way outside gardens and deserve attention here.

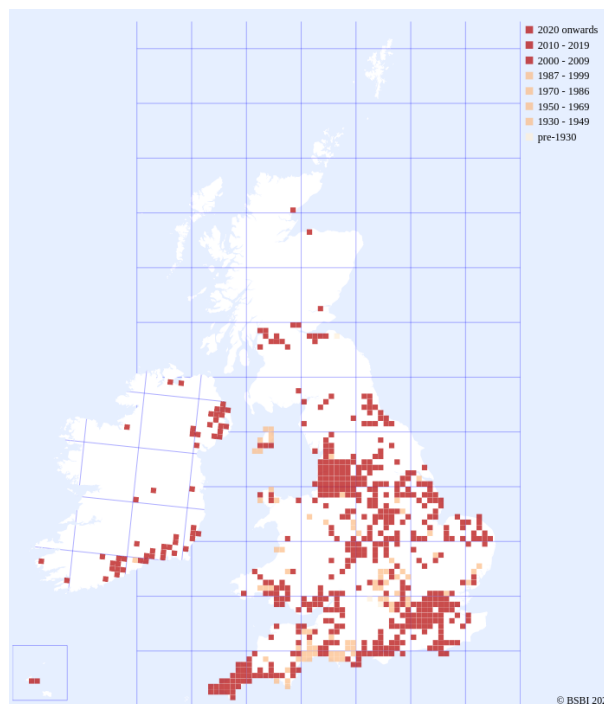


Aucuba japonica is very widely planted as a garden plant, municipal planting and hedging plant. It has ovate-lanceolate leaves up to 20cm long, dark rich green in its natural state but often grown as one of several cultivars with yellow or pale-green spots and blotches which are distinctive. Leaves can be entire or with several large teeth towards the tip. The fruit is a single-seeded berry.

***Aucuba japonica* (probably 'Hillieri', with barrel-shaped fruits)**



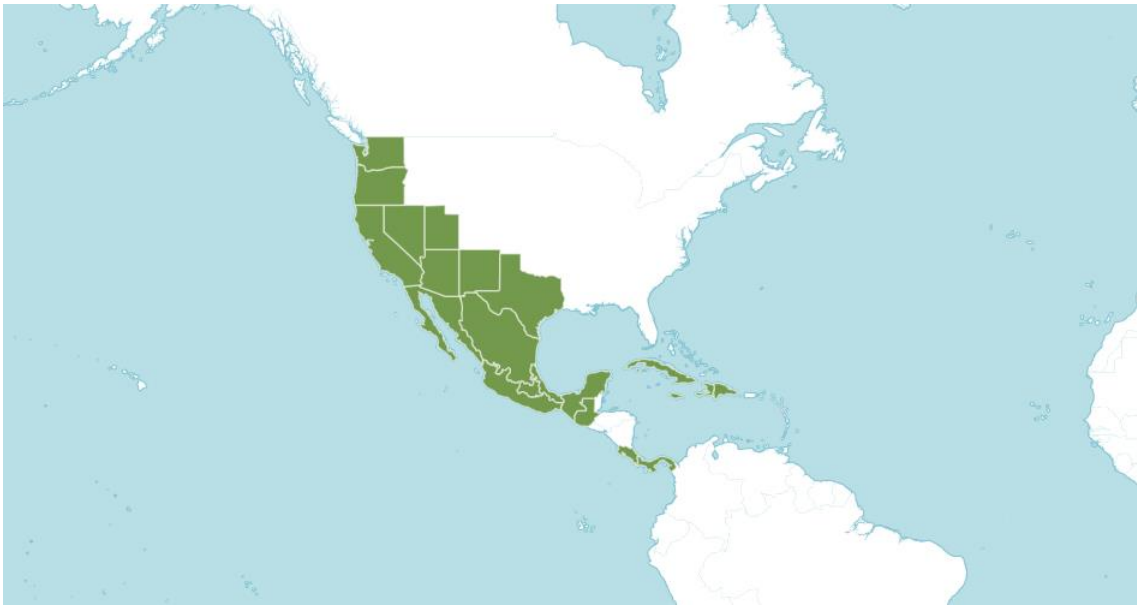
Aucuba japonica in one of its many blotchy cultivated forms



Aucuba japonica

Garrya Lindl. – Garryas

Garrya is another modest genus with 15 currently recognised species in the Americas and Caribbean. Eight of these (and a couple of hybrids) are listed as in UK cultivation, but again only one of them is likely to be seen outside a garden: there is a single record of escaped *G. x issaquahensis*, which would have a paler green leaf than *G. elliptica* with narrower, paler leaves and sparser hairs on young twigs, leaf undersides, bracts and ovaries.



Garrya elliptica is a small tree or large shrub that is less common than *Aucuba*, but highly distinctive in winter and early spring when its long, catkin-like racemes of male flowers are apparent. Leaves are elliptic with wavy edges, rounded to cuneate at the base, sometimes with an abrupt point (mucro) at the tip, up to about 10cm long, dull dark green on the upper side with paler veins, and shortly but densely hairy on the underside. Usually only the male is cultivated; the bracts are densely silky and grey-green. If a female is ever seen, it has berries which are densely hairy when immature and are two-seeded.



Garrya elliptica

OLEACEAE

Although several genera in this family like *Olea* (Olives) and *Ligustrum* (Privets) are evergreen or partially so, the species normally encountered outside gardens don't really qualify as leathery. Leaves are opposite in the genera we are considering, and stipules are absent. Inflorescences are in the axils of leaves, forming cyme-like panicles or short racemes. Flowers are small, 4-merous, and often fragrant.

Osmanthus Loureiro – Holly-olives

Osmanthus are evergreen trees and shrubs, with 36 currently recognised species in eastern Asia, New Caledonia and North America. Nine species and a couple of hybrids are grown.



Those we are considering are mostly sharp-toothed or with Holly-like spines, but their opposite leaves distinguish them from any Holly. They have dark purple 1-seeded drupes (fleshy on the outside, stony on the inside) with a single seed. They are rarely seen as escapes but are sometimes planted outside gardens.

Osmanthus key

Leaves usually > 4cm; corolla-tube ≤2.5mm	Leaves ≤2x as long as broad, entire or with sharp teeth ≤5mm, spaced ≤10mm apart	<i>O. x fortunei</i>
	Leaves >2x as long as broad, with teeth up to 10mm, 8-20mm apart	<i>O. heterophyllus</i>
Leaves usually 1-5cm; corolla-tube 3-12mm	Leaves 0.5-4cm, acute to rounded but with sharp tip	<i>O. delavayi</i>
	Leaves 2-5cm, acute or acuminate	<i>O. x burkwoodii</i>

O. x fortunei



O. x fortunei



O. heterophyllus



O. heterophyllus

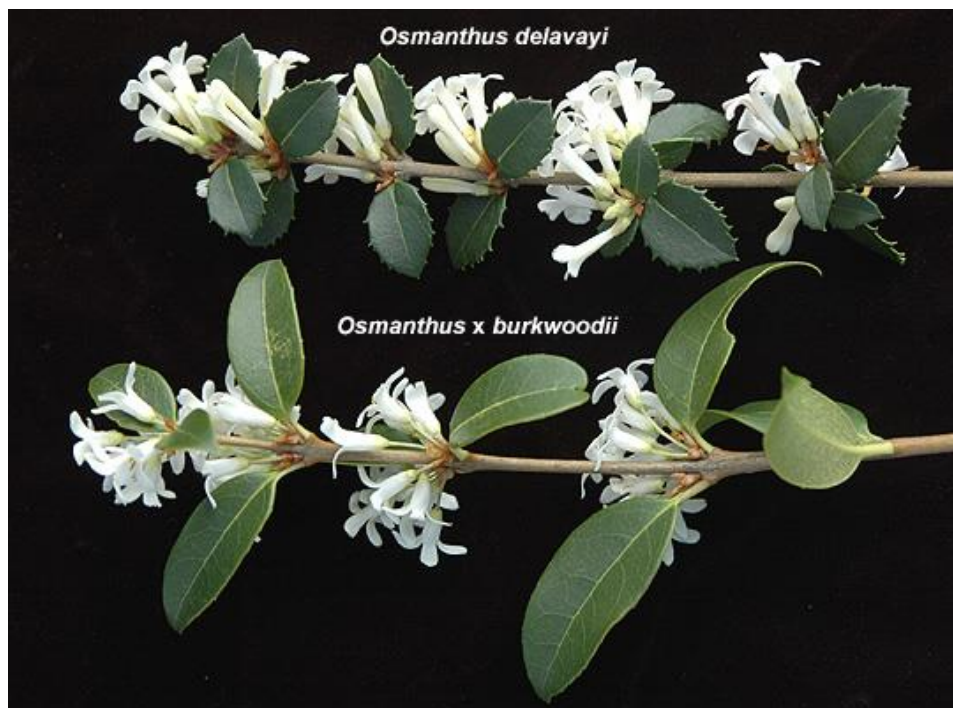


O. heterophyllus cv.
Sasaba



O. delavayi

O. x burkwoodii



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Phillyrea L. – Phillyreas

A small genus of shrubs or small trees from the Mediterranean and Levant. Currently only two species are fully accepted, although there are many subspecies and races of these. There are amenity plantings outside gardens in Britain, mostly near the South coast, but they are not yet recorded as escapes.



Leaves ovate to lanceolate, margins somewhat toothed

P. latifolia



Leaves narrowly lanceolate or narrowly elliptic, margins entire or sparsely toothed

P. angustifolia



AQUIFOLIACEAE

Ilex L. – Hollies

A genus of 500-700 species worldwide, which includes one of our few native evergreen broadleaves. Many are cultivated, and some of those (particularly our own *Ilex aquifolium*) have a multitude of cultivars and hybrids with great variation of leaf form. This makes identification of planted Hollies hard, but fortunately almost none have made it into the wider countryside; this account is limited to those few taxa that have.



Evergreen shrubs or trees. Leaves alternate, often spiny or hard-toothed to a degree, with no (or vestigial) stipules. Flowers in small axillary cymes, dioecious; flowers 4-merous; fruit a 2- or 4- seeded drupe. The key below really only works for some of the plants encountered because of the range of variability in both species and their hybrid.

Peter Sell says: "It is impossible to write a key to the hollies of Great Britain and Ireland unless all the cultivars are recognised". I am tempted to shorten this to "It is impossible to write a key to hollies". And if you try to use the key in the European Garden Flora, even on the few I deal with here, you may come to feel the same. The best I can do is give you a set of guidance notes and some warnings.

Ilex selected species: identification notes

I. aquifolium

Leaves dark glossy green, 5-12cm x 3-6cm, ±flat to strongly undulate at margins, often scalloped at margins, often with a spine at tips and otherwise entire, and often with spines all along margins (often with two extremes on same plant), stalks unwinged; flowers white, sometimes pink-tinged; petals 2-2.5mm; berries usually red, yellow in some cultivars



I. aquifolium cv. **Crispa**



	<p><i>I. aquifolium</i> cv. Madame Briot</p>
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<p>Leaves dark glossy green, 6-13 x 3-7cm, margins entire with apical spine or with a few teeth in the apical half, occasionally with sparse teeth all along margin; stalks unwinged; flowers white and pink- or green-tinged, petals 2-3mm; fruit red, orangey- or brownish-red</p>	<p><i>I. x altaclerensis</i></p>
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	<p><i>I. x altaclerensis</i></p>
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<p>Leaves mid to dark green, variably glossy and firm, up to 16 x 11 cm (small in subsp. <i>azorica</i>), not strongly undulate, apiculate at tip and entire or with a few short marginal spines; stalks often with narrow wings; flowers white, petals 2-3mm; berries usually deep red</p>	<p><i>I. perado</i> subsp. <i>?platyphylla</i></p>
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I. perado subsp.
perado



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I. perado subsp.
azorica



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Leaves dark, variably glossy green, 3-8 x 2-4cm, often shield-shaped, usually not undulate, with a strong spine at tip and often two lateral spines of similar length, occasionally with lower marginal spines; stalks unwinged; petals yellowish-white, 3-4mm; berries red, or rarely yellow in cultivars

I. cornuta



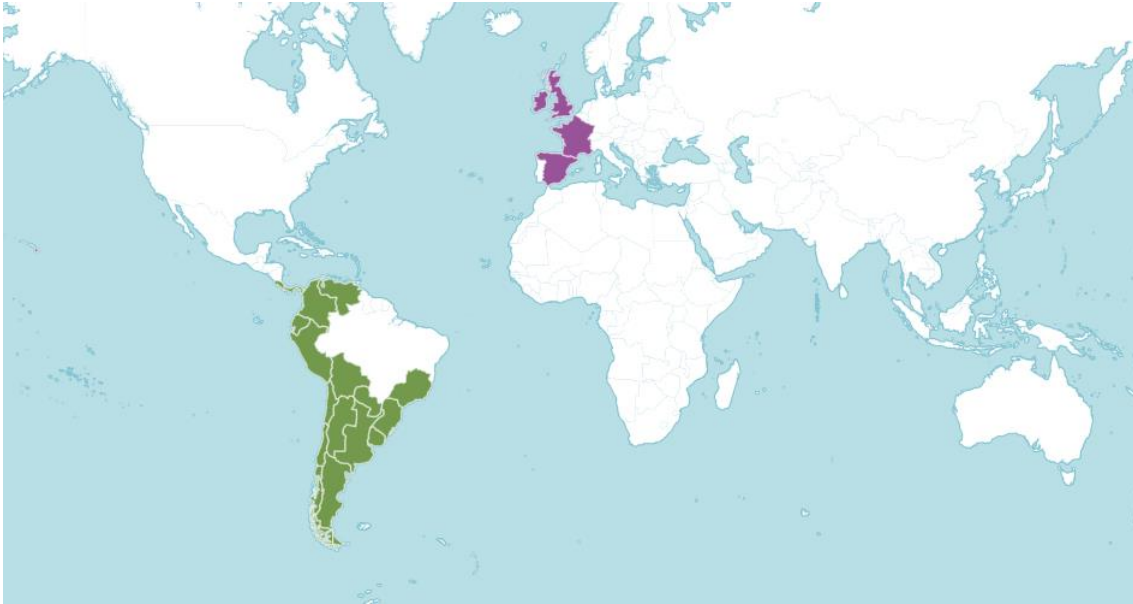
Some warnings about Ilex identification

- You will notice that there is a great deal of overlap in many of the dimensions of the taxa covered. In general, if you have two plants side by side you may be able to form an impression that one has larger leaves and floral parts than the other and is more likely to be a hybrid, but the situation is complicated enormously by cultivars.
- Beware of the heterophylly in *I. aquifolium*. You need to look at the whole tree. If it has some very undulate, strongly scalloped leaves with strong spines on the margins on some part of the plant (often lower down), it is unlikely to be *A. x altaclerensis*.
- *I. x altaclerensis*, the hybrid between *I. aquifolium* and *I. perado*, is almost continuously variable between the two parents, although most plants look more like the former. There will be specimens that are hard to determine, but a plant with leaves on average larger than typical *I. aquifolium*, all slightly undulate, none strongly scalloped and with a few spines mostly concentrated in the upper half will be a good bet. It is quite well distributed in the wild, but I suspect not quite as frequent as the records suggest sometimes.
- *I. perado* is pretty distinctive in two of its subspecies from the other taxa treated here, but subsp. *azorica* has much smaller, more leathery leaves and is more confusable.
- I have included *I. cornuta* here not because it is very likely to be found outside gardens and collections but Sell & Murrell (2009) does not cover it, while the dimensions quoted for *I. aquifolium* go below the bounds of most of its cultivars and I suspect *I. cornuta* has been included here. *I. cornuta* is a good Japanese species and has few forms and cultivars, and it warrants separate recognition.

ESCALLONIACEAE

Escallonia Mutis ex L. f. – Escallonias

A genus of about 50 species found in S America. Only one species, and one hybrid of garden origin, are of interest in Britain outside gardens, but these are used quite widely in amenity and hedge plantings, especially in the south, and will naturalise. Despite the hybrid having one deciduous parent, it is fully evergreen.



Shrubs or small trees; leaves alternate and rather leathery, ovate to obovate (narrowly elliptical in some forms), rounded to subacute at tip, wedge-shaped at base, with serrate teeth, with aromatic resinous glands; stipules absent. The flowers are distinctive, with a five-lobed calyx atop a cup-shaped hypanthium supporting five petals with a short or long claw and five recurved tips. The fruit is a many-seeded capsule.

Escallonia key

Leaves up to 8 x 4cm, sticky-glandular and resin-scented; inflorescence a terminal raceme or panicle; corolla-claws longer than lobes, forming an apparent tube, deep red or sometimes white or pink

E. rubra* var. *macrantha



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Leaves c. 2 x 1cm,
less glandular and
sticky; few-
flowered clusters
of flowers in upper
leaf axils; corolla
claws shorter than
lobes, not forming
an apparent tube,
usually pale pink

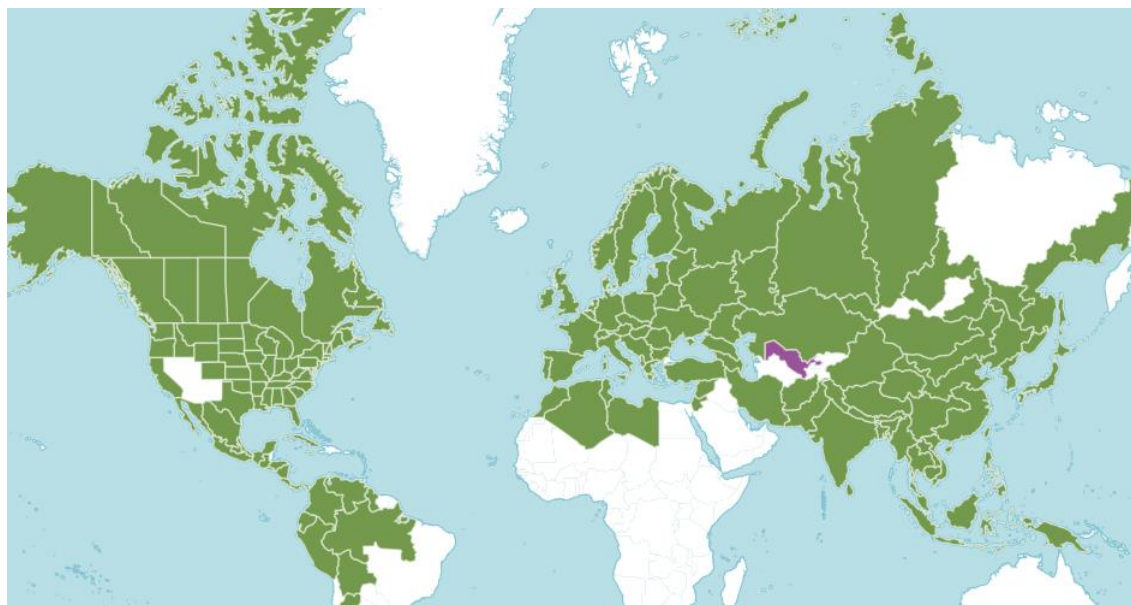
E. x langleyensis



ADOXACEAE

Viburnum L. – Viburnums

A widely distributed genus of temperate and subtropical regions, with over 200 members. About a dozen evergreens are grown in Europe; of these, three species and two semi-evergreen hybrids deserve attention here as they are all used in amenity plantings and some are established in the wild.



Shrubs or small trees; leaves opposite, simple, ovate or elliptical, entire or toothed; stipules absent or attached to leaf stalk. Inflorescences ±crowded, corymbose cymes. Flowers 5-merous; fruit a single-seeded drupe.

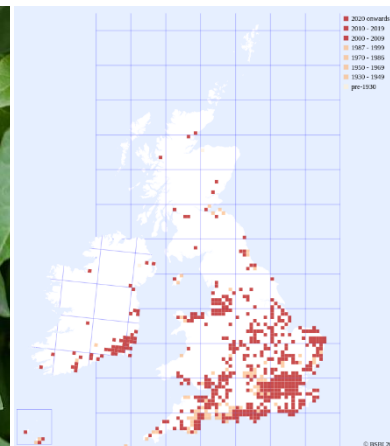
Viburnum key

Leaves smooth or raised only between three main veins	Leaves with 3 conspicuous subparallel main veins, impressed above, prominent beneath; flowering summer	<i>V. davidii</i>	
	Leaves with 4-7(-12) pairs of main veins, curving upwards	Evergreen; vein pairs up to 8, exceptionally 12; flowering winter – early spring	<i>V. tinus</i>
		Semi-evergreen; vein pairs usually 4-5; flowering summer	<i>V. x hillieri</i>
Leaves wrinkled	Leaves glabrous on upper side, strongly wrinkled	<i>V. rhytidophyllum</i>	
	Leaves with few to many stellate hairs on upper side, moderately to weakly wrinkled	<i>V. x rhytidophylloides</i>	

V. davidii



V. tinus



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V. x hillieri



V. rhytidophyllum



V. x rhytidophylloides

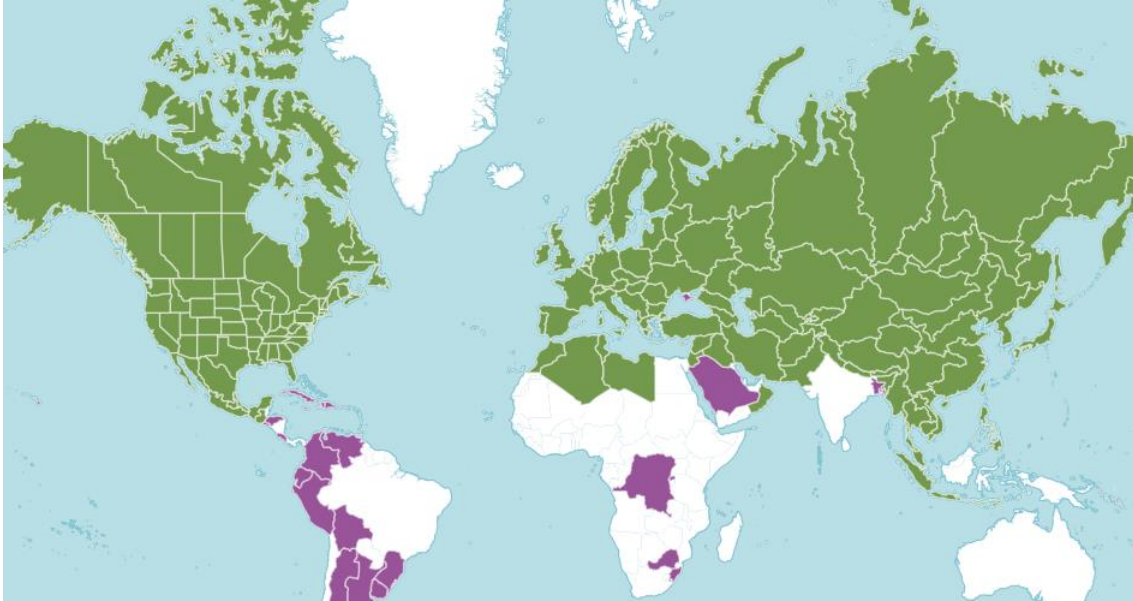


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CAPRIFOLIACEAE

Lonicera L. – Honeysuckles

Here is another quite large genus (about 200 species mostly in the north temperate zone, extending into the subtropics); between a third and a half are cultivated, along with some hybrids. Only a few are evergreen and of those, only a couple are leathery-leaved shrubs likely to be met with. They are both likely to be met with in amenity plantings, as hedging and (especially *Lonicera nitida*) as game cover in woodland, and both can be found naturalised.



Evergreen shrubs; leaves opposite, $\leq 32\text{mm}$, unlobed and untoothed, sessile or with very short stalks; flowers in pairs in the leaf axils; flowers 5-merous, corollas radially symmetric (unlike many Honeysuckles); fruit a violet or purple globose berry.

Lonicera key

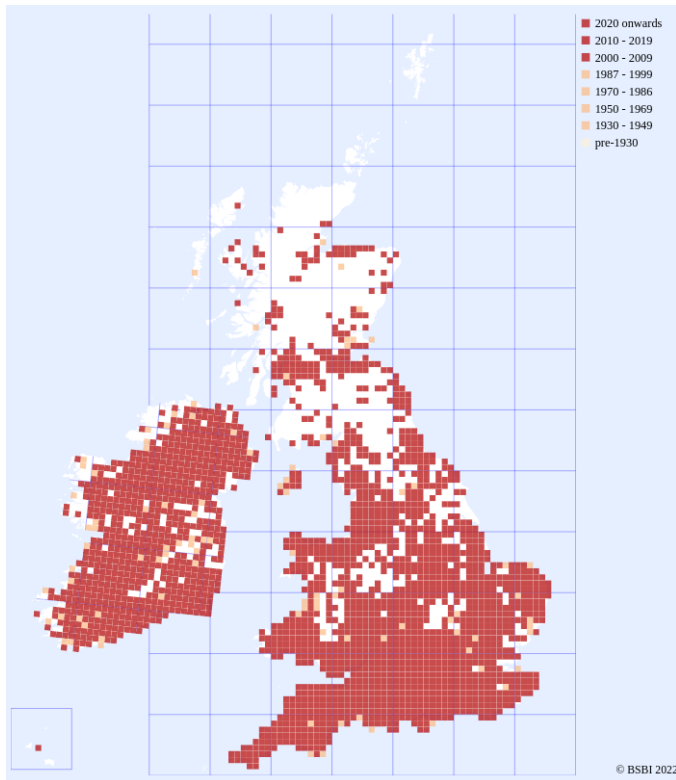
Plant usually >1m high; leaves mostly 6-16mm and ovate, rounded to \pm cordate at base, without raised midrib on upper surface

L. nitida

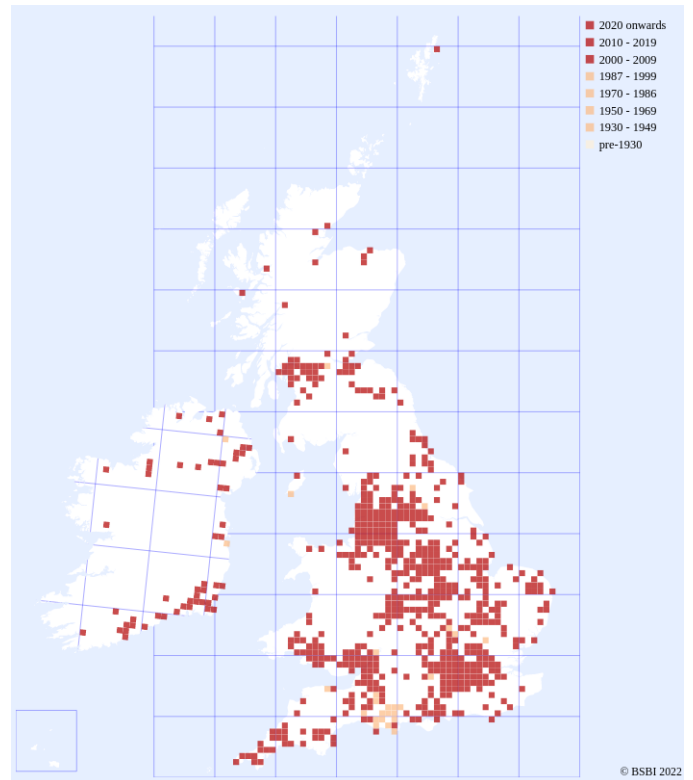


Plant rarely >1m high; leaves mostly 12-32mm and elliptic-lanceolate, wedge-shape to subacute at base, with raised midrib on upper surface

L. pileata



Lonicera nitida

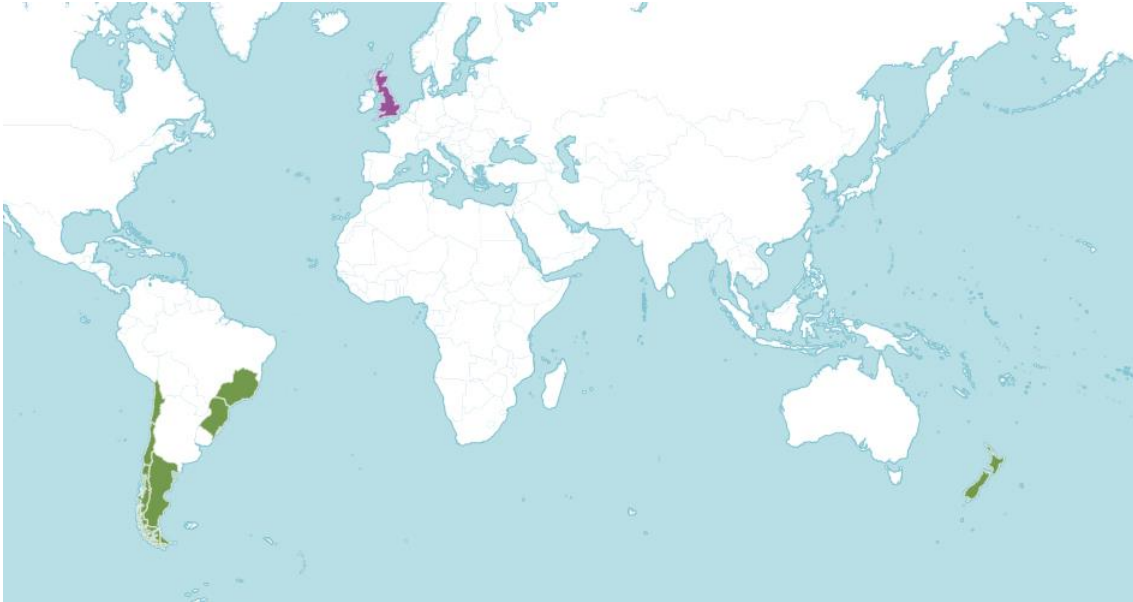


Lonicera pileata

GRISELINIACEAE

Griselinia G. Forst. – Broadleaves

The only genus of the family, with 7 species in S America and New Zealand. Four species are cultivated, but only one (*G. littoralis*) is an outstandingly popular mainstream horticultural plant (particularly for hedging) with several variegated cultivars. It has naturalised near coasts mainly in the south and west. However, some plants seen in gardens in the south have larger leaves and are asymmetrical at the base, and are probably referable to *G. lucens*, also native to New Zealand. It is tenderer than *G. littoralis* and is only likely to naturalise in very sheltered situations.



Leaves alternate, almost circular to broadly ovate or oblong, obtuse at tip, thick, net-veined, with leaf stalks 12-30mm; stipules absent. Flowers in panicles or racemes. Dioecious; flowers greenish, 3-4mm across, with 5-merous perianth but sometimes lacking petals in females, styles 3; fruit a single-seeded purplish-black berry.

Griselinia key

Leaves 2.5-11cm,
±symmetrical at
base; panicles 2.5-
7.5cm

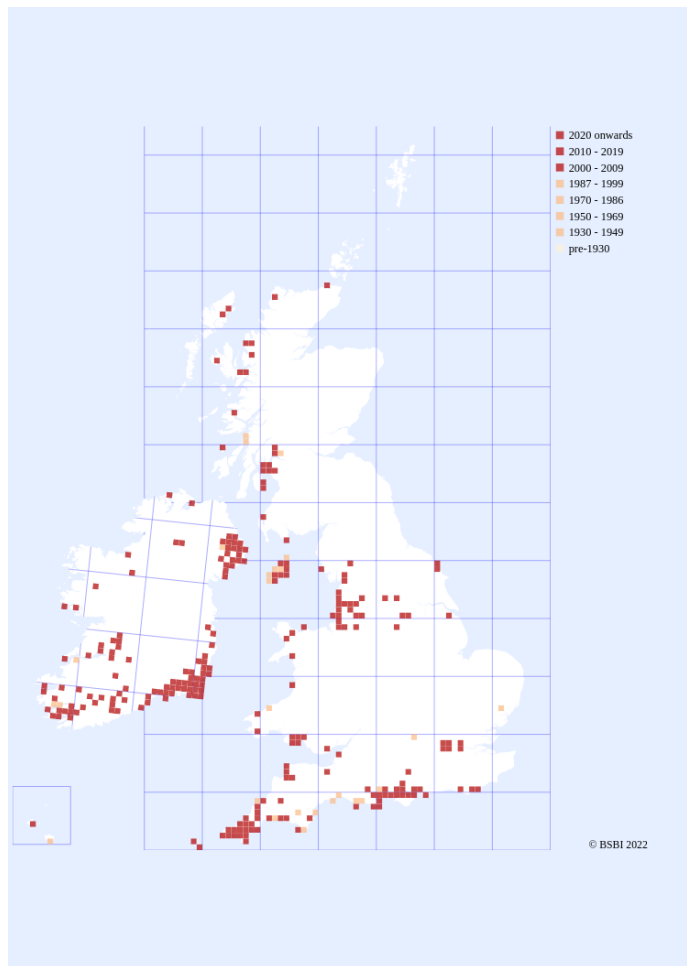
G. littoralis



<p>Leaves 7.5-20cm, often highly glossy (but beware the very glossy <i>G. littoralis</i> cv. Green Horizon), conspicuously asymmetrical at base; panicles 7.5-15cm</p>	<p><i>G. lucens</i></p>
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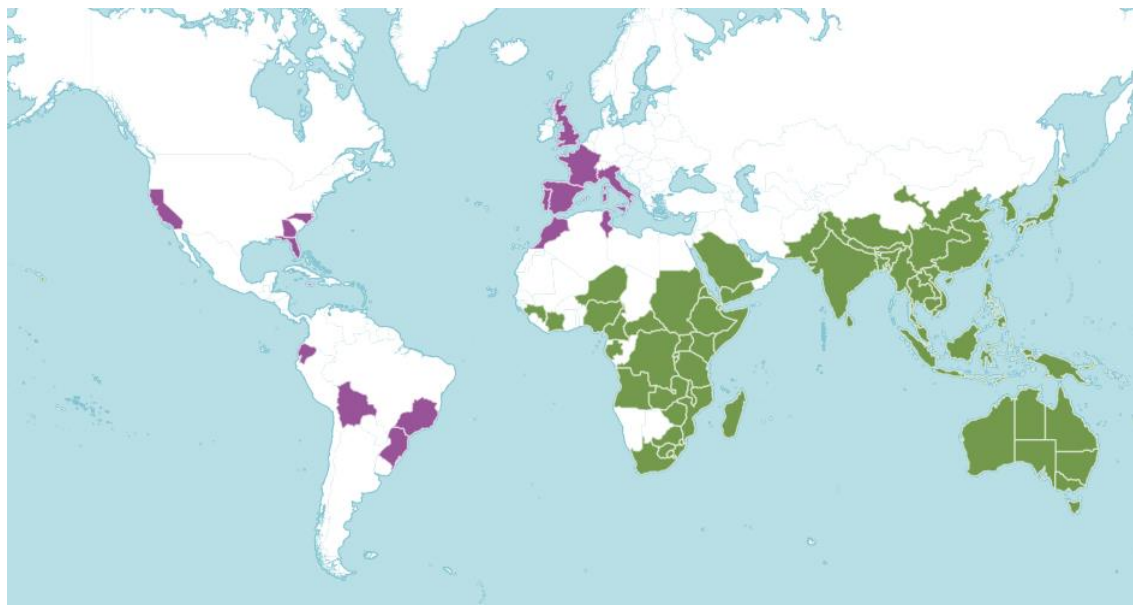


Griselinia littoralis

PITTOSPORACEAE

Pittosporum Banks ex Gaertn. – Pittosporums

These are plants largely of the tropics, subtropics, and warm temperate regions, with more than 150 species. Maybe 10 are cultivated in Europe, but not all are hardy and there are just two commonly sold species used as garden ornamentals, amenity plantings, hedging and shelterbelts. They naturalise, chiefly in southern Britain.



Another, *P. ralphii*, which was naturalised on the Scillies at least until the 1990s, resembles *P. crassifolium* treated below, but has larger more oblong leaves, rounded at either end and not recurved at the margins. *P. tobira*, which is sometimes planted but much more commonly so in southern Europe, has naturalised in a couple of spots in the SW. It has leaves entirely hairless like *P. tenuifolium* but not strongly wavy, and with revolute margins; creamy or yellowish (not dark crimson) flowers about twice the size, and fruit yellowish green (not blackish); and red (not black) seeds.

Shrubs or trees up to c. 10m; leaves alternate, or clustered and subopposite, elliptic to obovate, entire, acute at apex and wedge-shaped at base; stalks to 25mm; stipules absent. Flowers 5-merous; fruit a capsule with 3(4) valves.

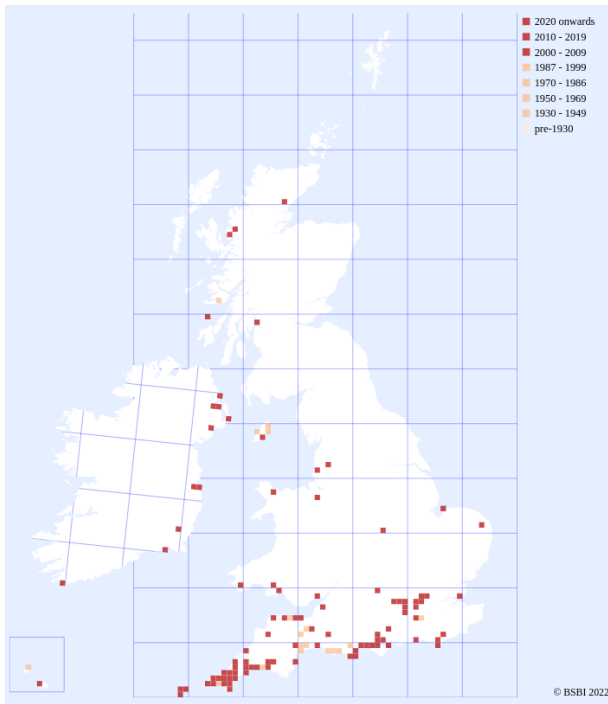
Pittosporum key

Leaves entirely hairless, up to 7cm long, strongly wavy at margins, net-veined, often variegated or coloured	<i>P. tenuifolium</i>
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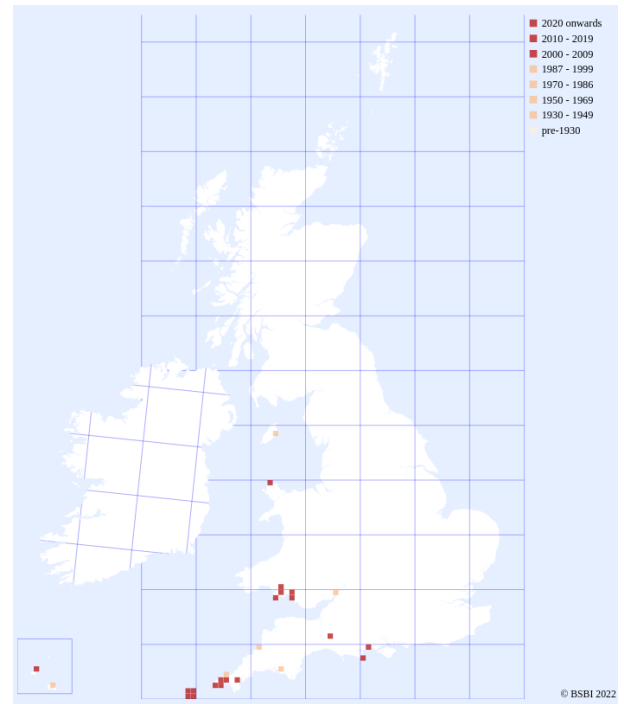


Leaves with whitish or buff-coloured hairs beneath and some hairs on upper side when young, up to 10cm long, slightly undulate and with recurved margins, not net-veined, sometimes with creamy-white margins

P. crassifolium



Pittosporum tenuifolium



Pittosporum crassifolium

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