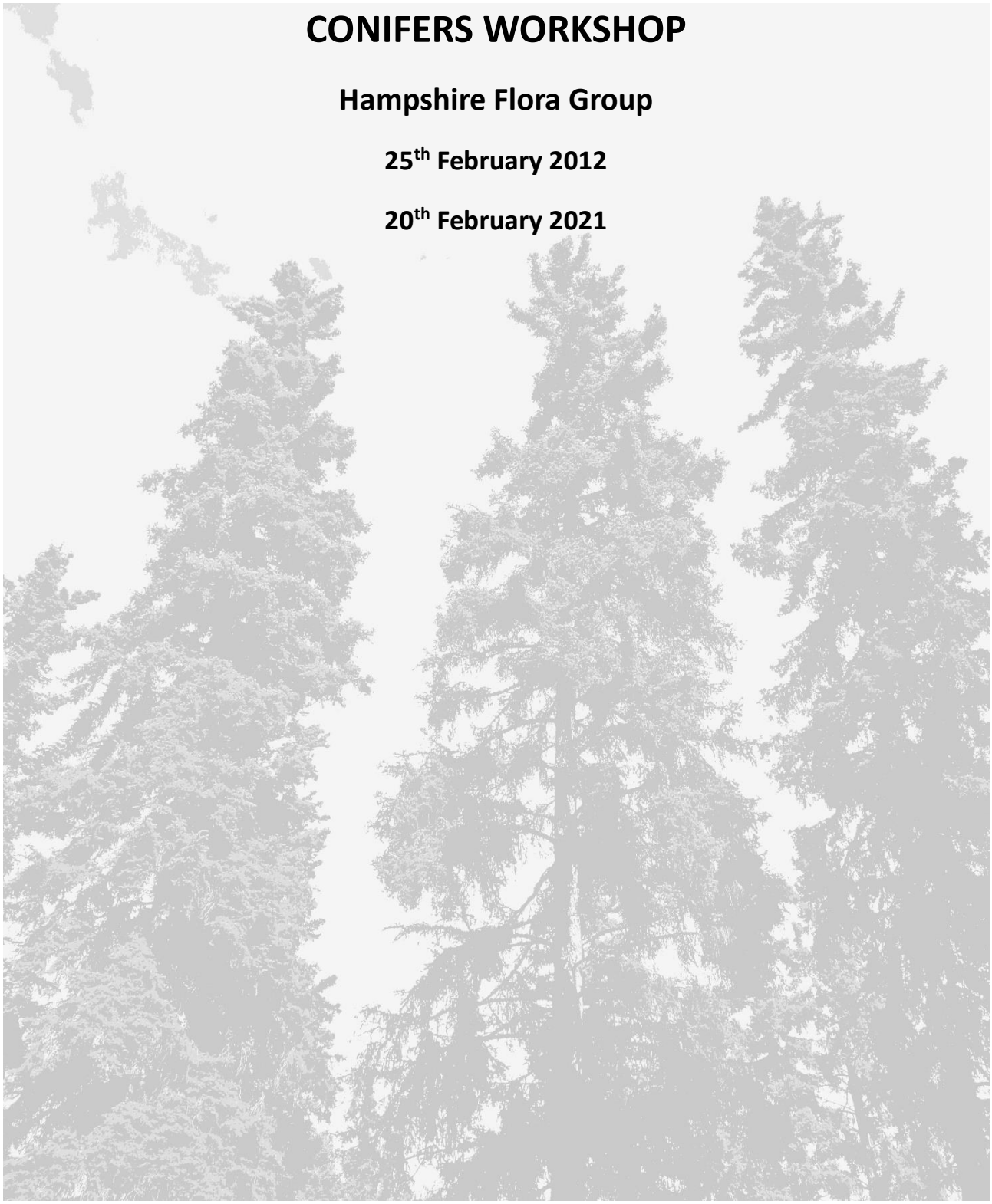
CONIFERS WORKSHOP

Hampshire Flora Group

25th February 2012

20th February 2021



Issue 2: January 2021

Taxonomic treatment of Stace edition 4 (2019) adopted

Keys and genus treatments expanded to new genera and species

Corrections

Updates to mapping

Further illustrations added

Enhancements to text

Why Study Conifers?

Conifers tend to be very much under-recorded in the wider countryside, a fact for which there are probably several reasons. No doubt one is that we have so few native species, and even their native range and ecology is on the whole rather restricted, so as a group they tend not to excite the same interest as others. Then there is the historical tendency (fortunately now disappearing) not to record introduced species, aggravated by the fact that our recent tendency to put them into dense, dreary rectilinear factory plantations has not endeared them to field botanists and conservationists.

However, we should not allow our own misdeeds to colour our judgement of the plants themselves. Conifers are a venerable group of plants, fascinatingly different and, as anyone who has spent time in a native forest will know, capable of forming landscapes of great beauty, majesty and magic.

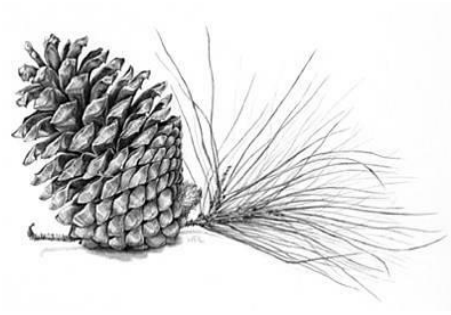
Whether you come to love them or not, several introduced species are capable of regenerating in the wild and making a significant impact on our environment. For that reason alone, one should get to know them and study them. Even the conifers capable of regeneration were grossly under-documented in the 1996 *Flora of Hampshire* and have been neglected ever since.

What is a Conifer?

Conifers are **seed plants**, like buttercups and lilies but unlike ferns and mosses. They are ancient and distinguished; they all spring from an evolutionary line going back 300 million years, which is not shared with any other seed plants. There are about 600 species world-wide, which is really not that many for a major plant group that plays a significant part in global ecology. 87% of species are placed in just three families; over one third of them belong to just four genera.

The term 'conifer' simply means 'cone bearing', but not all things conventionally thought of as conifers actually have cone-like structures, and some plants such as Alders do have them (although they differ in structural detail). Calling them 'evergreens' is even less precise, as there are a few deciduous conifer species, and anyway most other flowering plants are evergreen too; we just tend to forget that in temperate latitudes.

Conifers bear separate male and female flowering structures and can be either *monoecious* (bearing both on the same plant) or *dioecious* (bearing them on separate plants). The male structures may be referred to as either male cones or pollen cones; we use the latter and refer to the female structures as 'cones' or ‘female cones’.



Although they are a bit forbidding, some more descriptive terms are the technical ones, Gymnosperms ('naked seeds') and Angiosperms ('enclosed seeds'). The common arrangement for Gymnosperms is that the seed is embedded in a **seed scale** which is more like a small branch than the seeds of Angiosperms. It is joined to the axis of the stem at the base (axil) of a bract where it joins the stem axis.

A classic example of the ensemble, where the three-pronged bracts emerge from the scales, is the Douglas Fir *Pseudotsuga menziesii*. But the bract is usually less substantial, often hidden, and may have disappeared entirely by the time the cone is mature. An aggregation of 1-many seeds, usually woody seed scales and woody or papery bracts forms a female cone as we usually recognise it. There are also conifers where, in the course of evolution, seed scales have disappeared and modified bracts are left as the "scale".

However, conifers are not the only Gymnosperms. There are also the palm-like cycads, the gnetophytes (which include the shrubby Mediterranean Joint-pines *Ephedra*), and the unique Maidenhair Tree *Ginkgo biloba*.

Also, by some irony two-thirds of the native "conifer" species extant in Britain (Juniper and Yew) don't obviously have cones – a feature that they share with other Yew relatives and with the subtropical and southern hemisphere Podocarps. However, none of the conifers has the standard arrangement of an Angiosperm, whose seeds are contained singly or multiply in carpels of various kinds. Even the berry of a Juniper is formed of fleshy scales fused together, and so can technically be called a cone.

Recognition Features

Cones may be a prominent feature, but in fact they are rarely necessary for identification, and sometimes not that useful at species level. Many determinations can be made from stem, leaf and bud characters alone, with the leaf arrangement on the stem being the key starting point. It's important to look at what the leaf does where it is joined to the stem; quite a few conifers in certain genera look at a casual glance as if they have oppositely arranged leaves, but in fact they are simply turned to one side or the other, and their bases run spirally up the stem. In the same family, the shape and size of the point of attachment of the leaf can be important. In the accounts, 'shoots' refers to the most recent year's growth, and leaf descriptions refer to leaves there, unless stated otherwise. Many members of the family Cupressaceae have very different foliage on these shoots and older parts of branches.

Arrangement of stomata on the leaves can be important; fortunately, in conifers this is a feature quite easily observed with a hand lens. The shape of the leaf in transverse section may help to distinguish species of the same genus, and fairly simple leaf anatomy (observable with a hand lens) can help in separating genera.

Trunk sculpturing and colour are also useful, as is the general shape of the crown and how the leader shoot is borne. Many commonly planted species have a distinctive 'jizz' that makes it possible to recognise them from a distance with some experience. If you have a good sense of smell, the different scents of otherwise rather similar species can be helpful.

Finally there are the cones: size, shape, form of the scales, occasionally form of the bracts, and how they are held on the branches.

Notes on the Text

Each of the genus accounts starts with some general comments on the genus and an illustration. This is followed by an identification key where it is needed. Higher levels of the key include just a few diagnostic characters, but when an individual species is keyed

out, a larger range of characters is often given to help alert you to when you may have a similar species that is not covered.

Next the species are treated in alphabetic order, with brief notes on their status and distribution in the county. On the distribution maps, records since 2000 are shown with a black dot; earlier records are orange-brown.

Cedrus libani var. brevifolia

Key to Genera

Please note that this key is "artificial", in that it works on the recognition features which separate the plants likely to be met with outside special collections in Hampshire and will not work reliably for all members of a genus. In contrast, most of the formal taxonomy done by morphology rather than DNA relies on features of the cones and seeds, which are often not available in the field. If you are stumped by a planted tree, best to refer to one of the more comprehensive reference works listed later.

1 Some leaves 1cm wide or more ..... ***Araucaria*** **(Monkey-puzzles)**
1' All leaves less than 1cm wide 2

2 Leaves 10-15cm, in 2-ranked whorls around main shoots, each with a scale at base ..... ***Sciadopitys*** **(Umbrella Pine)**
2' Leaves strictly in opposite pairs or in threes at a stem node 3
2'' Leaves 1 at each node, spirally arranged (but often spreading into two rows), or bunched in pairs or clusters on short shoots 7

3 Leaves in a whorl of 3 around the stem, or with a mixture of (juvenile) 3-whorled usually needle-like leaves and (adult) paired opposite scale-like leaves ..... ***Juniperus*** **(Junipers)**
3' Leaves apparently in opposite pairs, usually appressed to stems at least at base 4

4 Leaf tips obtuse; branches at ends of twigs all spreading in several axes at angles; cones 2-4cm, more or less globular or box-shaped ..... ***Cupressus*** **(Cypresses)**
4' Leaf tips obtuse, acute or acuminate; branches at ends of twigs lying wholly or partly in one plane, and if partly, with a twist to the spray; cones either <2cm or else not globular or box-shaped 5

5 Shoot erect with arching side-shoots; foliage with solid thick white patch on underside bordered by dark green; lateral leaves boat-shaped, spreading but strongly incurved; facial leaves grooved with a thickened tip; cones with usu. 8 cone-scales, opening wide at maturity and losing a regular outline ..... ***Thujopsis*** **(Hiba)**
5' Not as above 6

6 Shoot foliage flattened or not; leaves with a parsley-like or resinous (sometimes orangey) oily smell; ♀ cones ± globose or box-shaped before opening, with scales centrally attached . ***Cupressus*** **(Cypresses)**
6' Shoots foliage always flattened; leaves unscented or with a different smell; ♀ cones elongated with cone-scales flattened, laterally attached 7

6 Leaves scented like pineapple sweets, pear- or apple-scented; shoots held ± horizontally; cones (6-)8-18mm long, cone-scales usu. 8-12, with spreading or recurved tips ..... ***Thuja*** **(Red-cedars)**
6' Leaves unscented; shoots held ± vertically; ♀ cones 10-20mm long, cone-scales 12-16, strongly hooked at tip ..... ***Platycladus*** **(Chinese Thuja)**
6'' Leaves with scent of polish or pencil wood; shoots held vertically, flattened; ♀ cones (6-)8-18mm long, cone-scales 4-6, flattened, laterally attached ..... ***Calocedrus*** **(Incense Cedar)**

7 Leaves long, needle-like, borne in 2s, 3s or 5s on very short side-shoots, ensheathed together at base and falling together ..... ***Pinus*** **(Pines)**
7' Leaves in clusters of 10 or more on short shoots and/or borne singly on main shoots 8

8 Most leaves in dense clusters on short shoots 9
8' All leaves borne singly on main and short shoots 10

9 Leaves deciduous, flattened in cross-section; cones up to 4.5cm long, not barrel-shaped ..... ***Larix*** **(Larches)**
9' Leaves evergreen, 3-5 angled in cross-section; cones up to 9cm long, barrel-shaped ..... ***Cedrus*** **(Cedars)**

10 All leaves with broader base and tapering towards apex, never flattened top to bottom 11
10' Mature leaves narrowed at base and apex, flattened or not flattened 12

11 Trunk with thick reddish spongy outer bark; leaves evergreen, ±3-ranked, wider than thick, harsh due to sharp point, with a leathery or aniseed-like scent; cones bluntly ovoid-oblong, 4.5cm long, bracts wrinkled and with a transverse groove ..... ***Sequoiadendron*** **(Wellingtonia)**

11' Trunk with a stringy outer bark; leaves evergreen, ±5-ranked, no wider than thick, forward-curved or spreading, with a resinous scent; cones globose, 2cm long, bracts with several hooked bristles..... .....***Cryptomeria*** **(Japanese Red-cedar)**

12 Trunk with thick spongy outer bark; leading shoots with small scaly leaves; cones c. 3cm, with leathery scales .....***Sequoia*** **(Coastal Redwood)**

12' Trunk with thin scaly outer bark; all leaves full-sized, narrowed to both ends (i.e., more or less stalked) 13

13 Leaves deciduous 14

13' Leaves evergreen 15

14 Leaves opposite, ±decurrent on to shoots, c. 2cm long; buds ≤1mm, produced beneath shoot junctions; ♀ cones rarely produced, subglobose to ellipsoid, 2-3cm long, with 16-24(-28) cone-scales with faces prominently notched transversely even when young.....***Metasequoia*** **(Dawn Redwood)**

14' Leaves arranged spirally / alternately, not decurrent, 1-1.5cm long; buds positioned conventionally in shoot junctions; ♀ cones often not produced, globose, 1-4cm, with 5-10(-15) cone scales which are sculpted but only fully notched when mature .....***Taxodium*** **(Swamp Cypress)**

15 Winter buds and first year shoots green; leaves without resin-canals; seed surrounded by a fleshy cup attached to its stalk.....***Taxus*** **(Yews)**

15' Winter buds more or less brown; first year shoots variously coloured; leaves usually with resin canals (sometimes interrupted); cones composed of woody scales.....16

16 Leaves with a slender short green stalk, ±flattened but not fused to twig and falling with the leaf; single resin canal under midrib of leaf; mature cones small (up to 2.5cm), neat, ovoid ..... ***Tsuga*** **(Hemlocks)**

16' Leaves narrowed at base, without a green stalk, but borne on a stalk-like brown peg or a sucker-like projection that stays on the twig, usually with a pair of resin canals, one each side of the midrib; mature cones larger than 2.5cm long..... 17

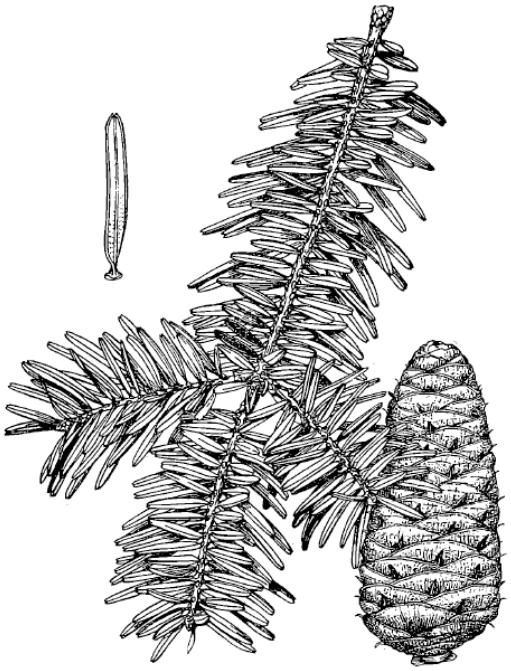
17 Leaves borne on distinct, brown, stalk-like pegs that are fused along the twig for much of their length .....***Picea*** **(Spruces)**

17' Leaves sessile on twigs or on a sucker-like projection 18

18 Winter buds shiny, reddish-brown, conical, sharply pointed .....***Pseudotsuga*** **(Douglas -firs)**

18' Winter buds not as above .....***Abies*** **(Silver-firs)**

ABIES P. Miller (Silver-firs)



World-wide the Silver-firs are a relatively large genus (40-50 species) distributed right across the northern hemisphere. Taking the genus as a whole, they are not easy to identify, but fortunately there are only a couple of species in the wider Hampshire countryside, and a couple more that are at all widespread in other parts of the country. We have covered nine species below, one of which is now being planted for the Christmas-tree trade; these are all potentially large, single-trunked trees with conical crowns made up of relatively short, horizontally spreading branches.

The leaves are borne on conspicuous rounded 'suckers' (compare Douglas-firs, whose suckers are smaller).

The cones are cylindrical or barrel-shaped, medium to large (10-25cm long at maturity) and borne singly on upright stalks, usually near the top of the tree. They come apart on the tree as they ripen, often leaving a characteristic 'stalk and topknot' behind. If you want to get familiar with the cones, a pair of binoculars often comes in handy, but a species found in parks and gardens (*A, koreana*) often bears its petite cones low down. The Hillier Gardens has good specimens of this and many other *Abies* species.

1 Leaves arranged ±radially all around twig 2
1' Leaves spreading sideways on top of shoot to reveal conspicuous parting along twig 3
1'' Leaves spreading or curved over shoot, more or less obscuring twig 4

2 Leaves 2-3cm long, usu. sharply pointed at tip, dark green and shiny above, with two narrow white bands above ..... ***A. cephalonica*** **(Greek Fir)**
2' Leaves 1-1.8cm long, bluntly rounded at tip, dark and shiny or dull and greyish green or blue with two broad bands of dull white below ..... ***A. pinsapo*** **(Hedgehog Fir)**

3 Young shoots glabrous or minutely downy; buds purplish, resinous; leaves 20-55mm long ..... ***A. grandis*** **(Giant Fir)**
3' Young shoots greyish, visibly hairy; buds brown, not or slightly resinous; leaves 15-30mm long ..... ***A. alba*** **(European Silver-fir)**

4 Leaves 4-5cm long, well-spaced, upswept ..... ***A. concolor*** **(White Fir)**
4' Leaves usu. ≤3.5cm long, ±dense ..... Table 1

Table 1

	A. amabilis (Red Fir)	*A. nordmanniana* (Caucasian Fir)	*A. procera* (Noble Fir)	*A. veitchii* (Shirabiso)
Bark	Dark grey, slightly corky, sometimes blistered	Grey, smooth to fissured into small square plates, sometimes more roughly fissured	Silvery-grey to dark purple and dark grey, smooth with a few large black fissures and fine sinuous cracks	Dark grey or whitish grey, smooth, with whitish patches on ageing, fluted, with large "pockets" under each branch
Buds	3-4(-5)mm long, globular, resinous on ageing	3.5-5(-6)mm long, usu. ± without resin	2.5-3.5mm, not resinous, hidden among leaves	3-4.5mm long, moderately to heavily resinous
Shoots	Glabrous or with very short pale pubescence, not ribbed; needles spreading at right angles at sides and becoming forward-pointing above	Shiny in first year sometimes with dark or reddish hairs, ribbed, pink-brown in second; needles all forward-pointing, upper ones strongly so and close to shoot	Dark orange, smooth or slightly ribbed, with fine reddish pubescence in first year, becoming dark purple-brown; upper needles forward pointing at base, curving to erect or slightly back	Shoot buff, pinkish-brown or grey, slightly ribbed, often with brown curly pubescence; lower leaves pointing forward at c. 45°, upper pointing forward or nearly erect
Leaves	1.5-3cm, shining rich dark green by 2nd year, 2 broad white bands below, plump in cross-section	1-3(3.5)cm, shiny dark green with 2 broad white bands beneath; flat in cross-section	1-3.5cm, upper surface dark grey-green with two broad bands of scattered white stomata at apical end, with two fairly narrow grey-white bands beneath; flat to slightly plump in cross-section	(0.5-)1-2.5-3cm, ± shiny with faint white dusting, with two brilliant white bands beneath; flat to slightly plump in cross-section

***Abies alba* (European Silver-fir)** has been recorded from several inclosures in the New Forest and has regenerated there. It is possibly overlooked elsewhere.

Bolderwood Grounds	SU239082
Dames Slough Hill area	SU253053
Puckpits Inclosure	SU255096
Ober Water, Rhinefield	SU264031
Clumber Inclosure	SU265033
Blackwater Arboretum	SU265047
Parkhill Inclosure	SU322058

***Abies amabilis* (Red Fir)** is a rare planting in Hampshire.

Weston Common	SU6944

***Abies cephalonica* (Greek Fir)** is another rare planting in Hampshire.

Weston Common	SU6944

***Abies concolor* (White Fir)** is yet another rare planting in Hampshire.

Alice Holt Lodge	SU8042
Weston Common	SU6944

***Abies grandis* (Giant Fir)** is a more frequent but scattered planting in Hampshire. It is regenerating in small numbers in some sites.

***Abies nordmanniana* (Caucasian Fir)** is now a popular tree for the Christmas-tree trade and you can expect to see it in plantations.

Bolderwood	SU2409
S of Overton	SU502477
Lasham Wood	SU693429
Bentley	SU772437
Clockhouse Copse, Setley	SZ1697

***Abies pinsapo* (Hedgehog Fir)** is a rare tree of NW Africa and Andalucia; it is red-listed in Spain. We have only two records of plantings in Hampshire, both by the Forestry Commission.

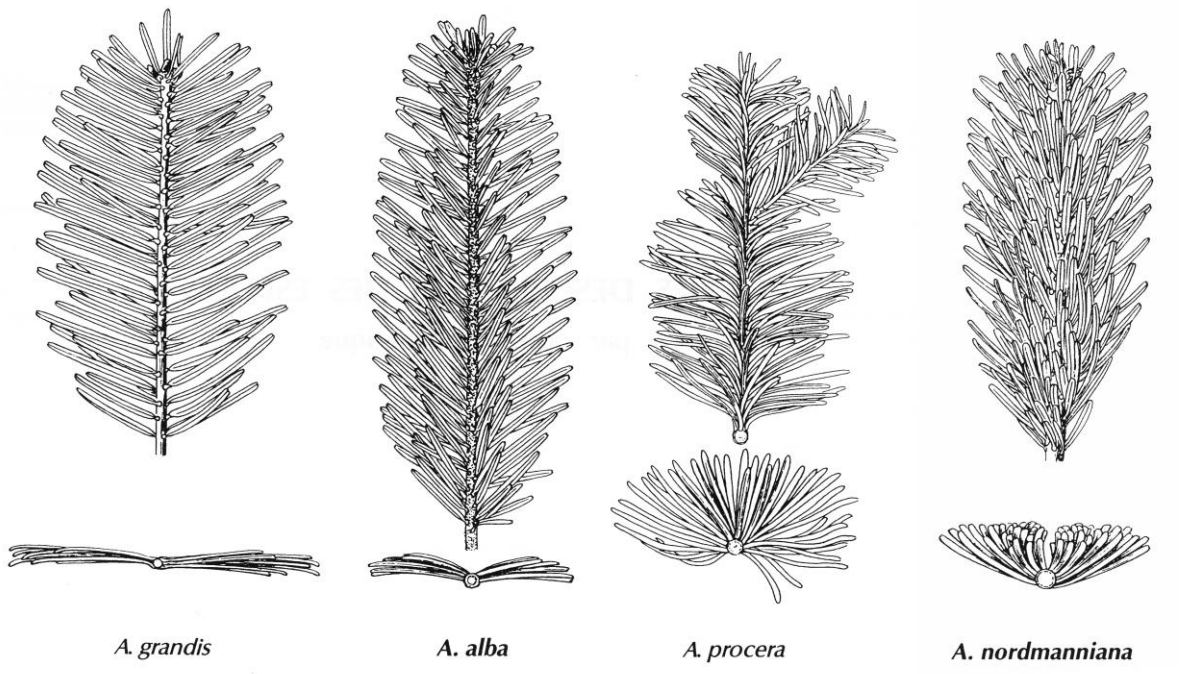
Rhinefield Arboretum area	SU265047
Ampfield Woods	SU408241

***Abies procera* (Noble Fir)** is so far recorded in Hampshire only from a few sites as a planting. It is much more widespread in the west and north of Britain.

Ibsley	SU156094
Rhinefield	SU265048
Silchester	SU635618
Alice Holt Lodge	SU772437

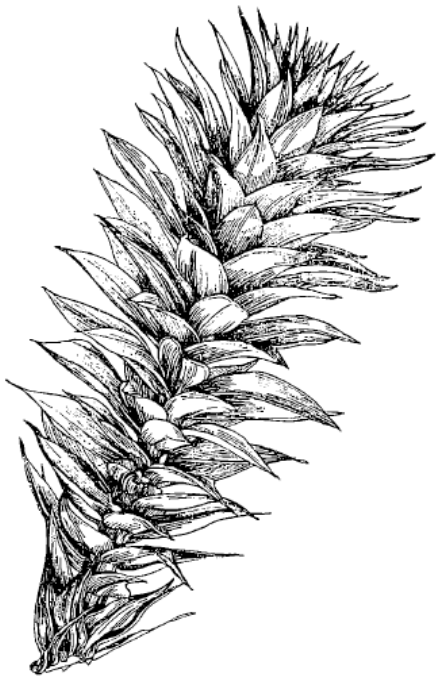
***Abies veitchii* (Shirabiso)** has a single planting record in Hampshire.

Rhinefield Arboretum area	SU265047



Abies amabilis

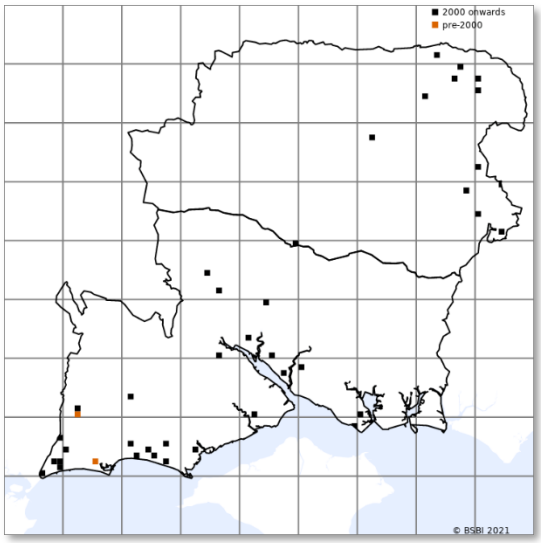
ARAUCARIA Jussieu (Monkey-puzzle)



The natural distribution of this genus is entirely confined to the southern hemisphere (South America and Australasia, with three-quarters of the 19 known species confined to two smallish islands.

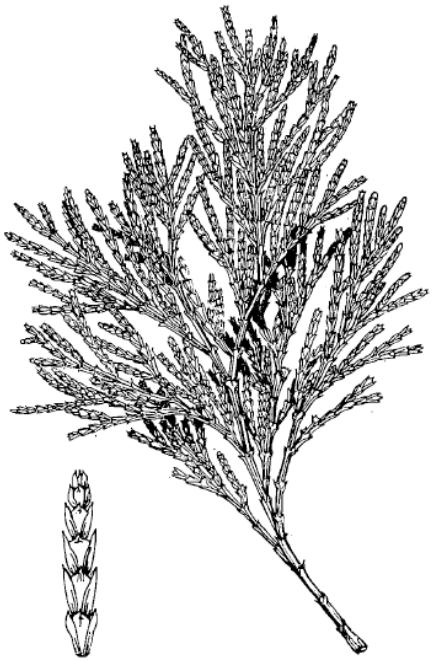
The only species you are likely to see outside a collection or garden in Britain (*Araucaria araucana*, Monkey-puzzle) is easily distinguishable by its broad triangular leaves, although other species can have scale-like or needle-like leaves.

It has a scattered but wide distribution in Hampshire, mostly on the more acid soils but usually as a planting. It seems to be an unaccountably popular suburban garden planting in some parts.



CALOCEDRUS W. Kurz (Incense Cedar)

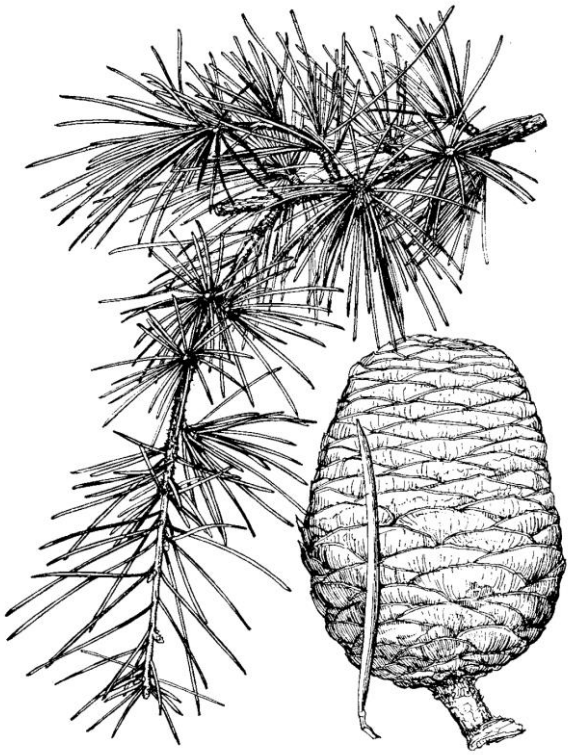
There are just three species in this genus, found in western North America and SE Asia. The only one you are likely to find outside a collection is *C. decurrens*, which is illustrated here. The Hillier Gardens also has *C. formosana*, which is marginally hardy and needs shelter trees. The almost vertically held shoots characteristic of the genus as a whole, and the quite long narrow lateral scale-leaves, are distinctive.



There is currently only one record in Hampshire.

Ashley Manor Farm area	SZ259948

CEDRUS Trew (Cedars)



There are just two or three species of Cedar in the world, depending on whether you accept the Atlas Cedar as a separate species or merely as a subspecies of Cedar-of-Lebanon. Here we treat it separately, in line with the British floras. Each has a distinctive and well-separated native range: *atlantica* in Morocco and Algeria; *libani* in the Middle East and northern Turkey; *deodara* in the western Himalayas and Hindu Kush. All are widely planted in Hampshire; two have been noted as regenerating from seed, but Cedar-of-Lebanon has not; that seems to be the pattern in Britain as a whole, too.

The numerous evergreen fine needles clustered together on short shoots are distinctive, but on the growing long shoots at the ends of branches you will also find single leaves spirally arranged, sitting on a little peg rather like Douglas-fir's. The cones of Cedars are chunky, barrel-shaped and held upright singly on the branches. They disintegrate on the tree, releasing their seeds in the process. Note that all species have glaucous cultivars, and all have pendulous cultivars. *C. libani* also has a short-leaved subspecies *brevifolia* found on Cyprus, sometimes treated as a separate species. The Hillier Gardens have a good specimen of this.

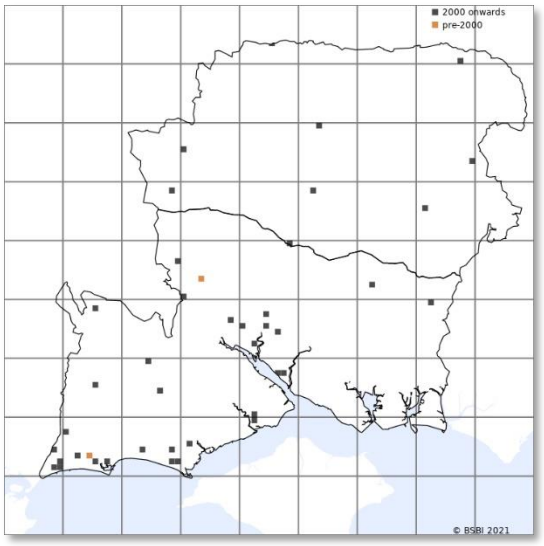
1 Leader shoot and tips of side branches drooping; leaves on short shoots 3-6cm, flexible; translucent leaf-tips c 0.4mm long, colourless or buff ..... ***C. deodara*** **(Deodar)**

1' Leader shoot erect or bent to one side; leaves on short shoots mostly less than 3cm, stiff; translucent leaf-tips variable in length, reddish or yellowish..... 2

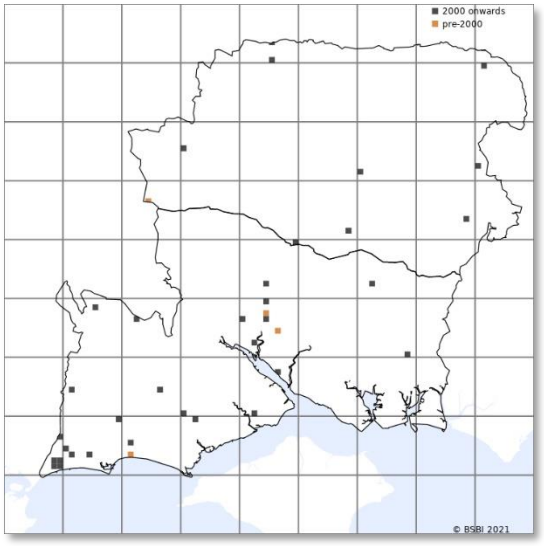
2' Young branches mostly horizontal; young twigs glabrous or, if pubescent, not darkly so; leaves up to 3cm, usually dark green (sometimes glaucous); translucent leaf tips c. 0.2mm in length, usually reddish ..... ***C. libani*** **(Cedar-of-Lebanon)**

2' Young branches usually upswept (sometimes pendent); young twigs blackish-pubescent (but often losing this by second year); leaves up to 2cm, frequently glaucous (sometimes dark green); translucent leaf tips up to c. 0.5mm, usually yellowish ..... ***C. atlantica*** **(Atlas Cedar)**

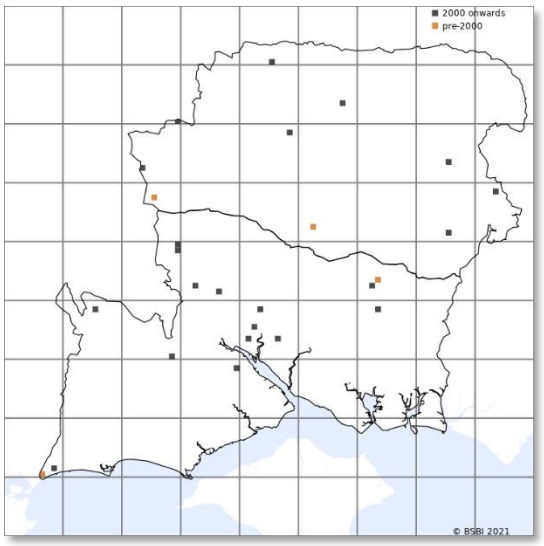
***Cedrus atlantica* (Atlas Cedar)** is currently enjoying enormous popularity as a suburban planting in its glaucous form (cv. 'Glauca'); one wonders whether some of the planters realise what they will end up with.



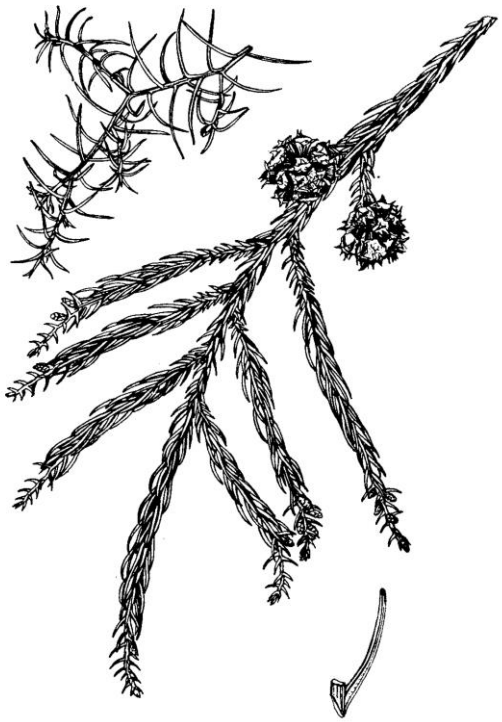
***Cedrus deodara* (Deodar)** is also quite a popular garden planting at present, although on nothing like the same scale. There are specimen trees from the mid-19th century at Highclere, Herriard and Bolderwood.



***Cedrus libani* (Cedar-of-Lebanon)** is not always easy to distinguish from *C. atlantica*, and it also has a glaucous form (cv. 'Glauca'). Most of the older plantings in Hampshire are of this species, where its dark foliage and layered horizontal branching make it easy to spot. Specimens at Lockerley were planted in 1760 and those at Highclere in 1792. Other fine trees are at Dogmersfield, Stratfield Saye, Jenkyn Place, Bentley, and Exbury.

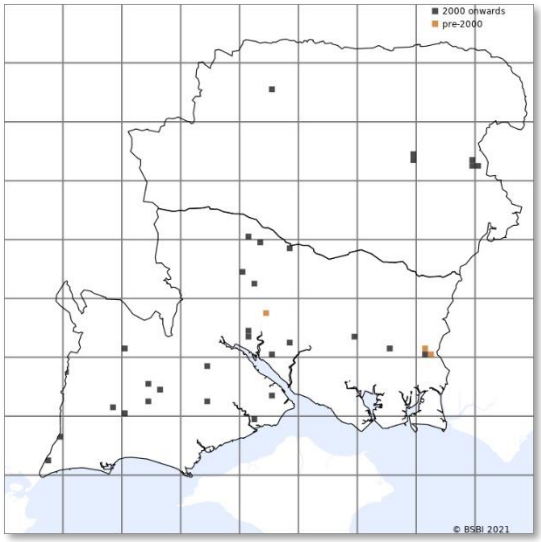


CRYPTOMERIA D. Don (Japanese Red-cedar)



There is a single species of *Cryptomeria* world-wide, and it is a distinctive tree. It is native to Japan and (possibly) some enclaves in China. A few planted rarities aside, its foliage is unlikely to be confused with anything except perhaps Wellingtonia, *Sequoiadendron giganteum,* but its leaves are longer (part unattached to stem up to 20mm compared with up to 7mm) and usually spreading but curved inwards (but watch out for the cultivar 'Elegans' which has spreading needles as shown in the inset); its bark is stringy rather than spongy; and its 2cm cones are very distinctive, with up to 5 sharp teeth on each scale.

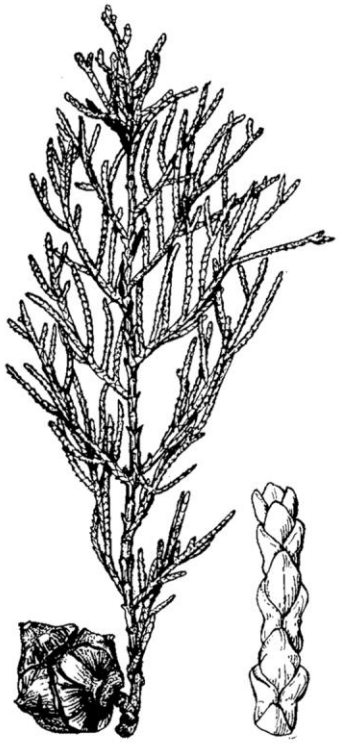
Cryptomeria japonica **(Japanese Red-cedar)** has a scattered distribution in Hampshire and is so far mainly recorded in the south of the county. There are specimen trees at Bolderwood, Embley Park and Blackmoor, and the remains of a substantial planting at West Wood, Sparsholt.



CUPRESSUS L. (Cypresses)

There are 22 species of *Cupressus* widely distributed across the northern hemisphere; this is based on Stace's treatment, where *Chamaecyparis, Xanthocyparis* and intergeneric hybrids are treated as members of *Cupressus*. Not all authorities follow this taxonomy.

The merging of the genera brings together plants with rather different morphologies, a wider range of cone size and much variation in leaf arrangement. The illustration shows *C.* macrocarpa, one of those with a 3-dimensional branch arrangement on shoots and relatively large cones. Cypresses with a flattened branch arrangement may be confused with species of *Thuja* – if cones are present there should be no difficulty, and if you have a good sense of smell, the odours are also distinctive.



1 Terminal branches not flattened, spreading in 3 dimensions 2
1' Terminal branches flattened, mainly or wholly spreading in one plane 5

2 ♀ cones 2.5-3.5cm 3
2' ♀ cones ≤2cm 4

3 Foliage scentless or faintly rubbery; terminal branchlets smoothly cylindrical with acute leaf-tips. Variable, but mostly a columnar tree with ascending-recurved branches ..... ***C. sempervirens*** **(Mediterranean Cypress)**
3' Foliage fruitily aromatic; crown becoming domed to flat-topped; branches widely spreading ..... ***C. macrocarpa*** **(Monterey Cypress)**

4 Leaves glaucous or mid- to dark grey-green, conspicuously spotted white with resin; ♀ cones c. 1.5cm ..... ***C. glabra*** **(Smooth Arizona Cypress)**
4' Leaf colour very variable; leaves not conspicuously white-spotted; ♀ cones 1.5-2cm, but rare except in one cultivar ..... ***C.* x *leylandii*** **(Leyland Cypress)**

5 Terminal branchlets marked with white beneath; ♀ cones with small prickle or ridge on each cone-scale 6
5' Terminal branchlets not marked with white beneath; ♀ cones with prominent conical spine on each cone-scale 8

6 Leaf-tips of terminal branches obtuse and/or incurved; conspicuously banded with white on leaf margins and some bases; ♀ cones c. 2cm with small central ridge ..... ***C. obtusa*** **(Hinoki Cypress)**
6' Leaf-tips of terminal branches acute; white banding on leaves conspicuous or not; ♀ cones < 10mm 7

7 Leaves acute to narrowly acute, the dorsal row with conspicuous translucent gland on back; ♀ cones c. 7-9mm ..... ***C. lawsoniana*** **(Lawson's Cypress)**
7' Leaves acuminate, with inconspicuous dorsal gland; ♀ cones c. 5-6mm ... ***C. pisifera*** **(Sawara Cypress)**

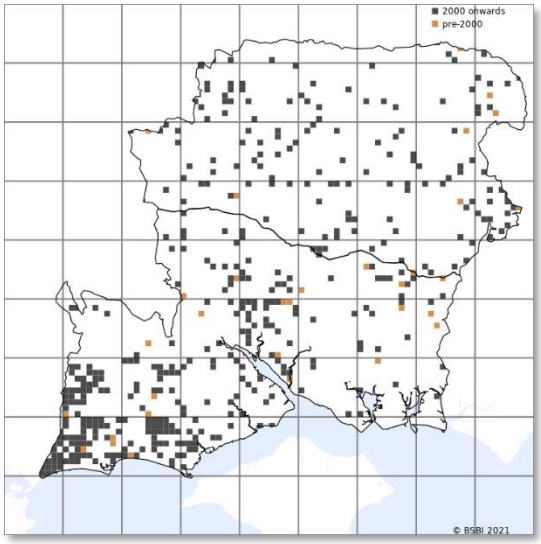
8 Terminal branchlets pendent, spreading entirely in 1 plane; ♀ cones 8-12mm
..... ***C. nootkatensis* (Nootka Cypress)**

8' Terminal branchlets patent to erect, not spreading entirely in one plane; ♀ cones mostly 15-20mm
..... ***C.* x *leylandii* (Leyland Cypress)**

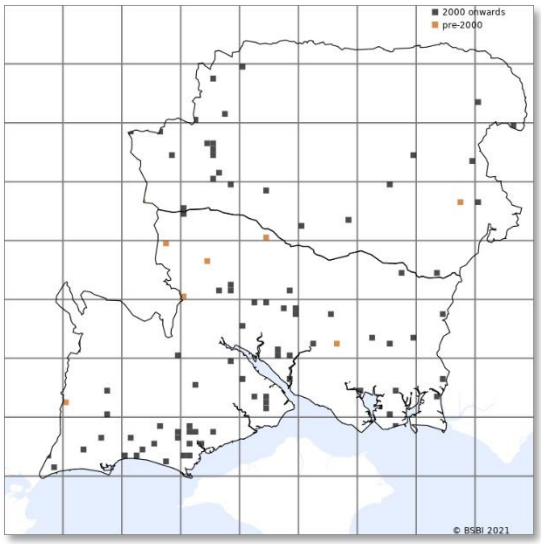
Cupressus glabra* (Arizona Cypress)** and ***C. arizonica are names applied variously in the horticultural trade, the former usually being given to a smooth-trunked form with bluish foliage. It is drought-resistant, cold-resistant and lime-tolerant, so it may appear as a planting on the central Hampshire chalklands.

Muscliff Arboretum	SZ0996
St Catherine's Hill, Christchurch	SZ1496
Harpway Lane, Winkton	SZ1696

***Cupressus lawsoniana* (Lawson Cypress)** is by far the commonest species encountered in Hampshire. It is very widely planted as an ornamental in an enormous range of forms; it is sometimes also used in shelter-belts and coverts, and more rarely as a so-called "nurse tree" for hardwood forestry plantations (but in both these situations, beware confusion with *Thuja plicata*). There are good specimen trees at Rhinefield.



***Cupressus* x *leylandii* (Leyland Cypress)**: this hybrid arose naturally at the very end of the 19th century at the Royal Forestry Society's arboretum at Leighton Park near Welshpool (which was then part of the private estate of Mr. Leyland). It is a hybrid of the Nootka Cypress *Cupressus nootkatensis* and the Monterey Cypress *Cupressus macrocarpa*. It has to be the most notorious conifer in Britain. A lot of people must love it since so many are sold, usually as hedging or screening. A lot of people certainly hate it because so many are sold, usually as hedging or screening. It is one of the fastest-growing temperate conifers known in the world, and nobody knows just how big it can get, as there are none that have yet gone through maturity to senescence. Several different hybrid clones arose spontaneously at Leighton Park, and were collected and given cultivar names.



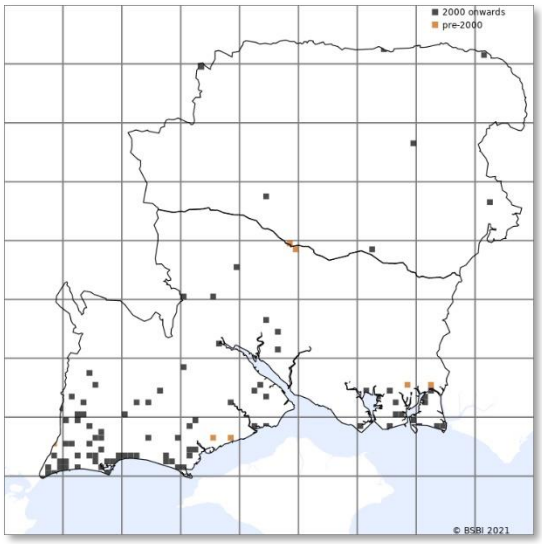
Because of the variability in the cultivars, it is quite difficult to give a good brief technical description of the foliage, and one can only say that this is a plant which looks half-way between the *C. macrocarpa* parent with its branchlets at angles, and *C. nootkatensis* with its more or less flattened branchlets. That is, the branch ends typically have twists and turns quite unlike its keenest rival in the hedging world, *C lawsoniana*. Beyond that, the best thing to do is read the account in Mitchell (1972).

Only one of the clones (the original 'Leighton Green') regularly produces either male or female cones, and so a total absence of cones on a reasonably mature plant can be suggestive, if not indicative, of this hybrid.

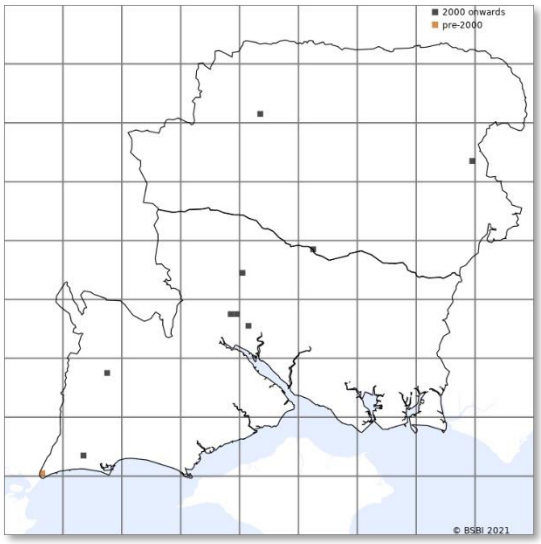
Sometimes planted into hedgerows remote from gardens, and probably under-recorded. There is no recorded regeneration even from cone-bearing strains. It is undergoing browning and die-back which is mostly, but not exclusively, caused by the Cypress aphid (*Cinara cupressivora*). This aphid can also affect *Thuja*.

Although you are very unlikely to meet it in the countryside at large, it is worth mentioning that there is another hybrid ***Cupressus* x *notabilis* (Alice Holt Cypress)** with special Hampshire connections. This is a hybrid between *C. nootkatensis* and *C. glabra*. It was collected at Leighton Park during a hunt for more seedling Leylands in the 1950s, and then grown on at Alice Holt.

***Cupressus macrocarpa* (Monterey Cypress)** is quite widely planted here, especially near the coast. The distribution map below is almost certainly an under-recording. There are good specimen trees at South Baddesley, Sowley, Embley Park and Langstone Harbour. Mature trees often take on distinctive and striking shapes, sometimes with main side branches sweeping down towards the ground and then up, sometimes spreading and rather flat-topped like a Cedar-of-Lebanon. As far as I am aware there is no evidence yet for regeneration in Hampshire.



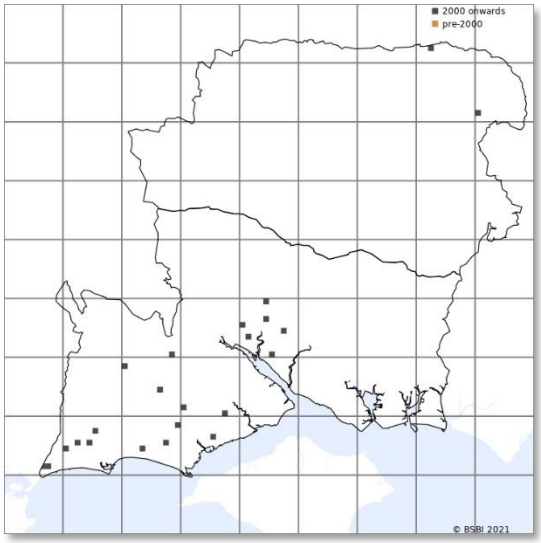
Cupressus nootkatensis **(Nootka Cypress)** is almost certainly under-recorded; it is a fairly common planting generally in the country, often in public spaces, and has been introduced into forestry plantations. At Lords Wood it has regenerated from seed. It is one of the parents of Leyland Cypress.



Cupressus obtusa **(Hinoki Cypress)** appears to be a rare planting in Hampshire but may be overlooked. The stubby foliage gives it a distinctive look.

Anns Hill old cemetery, Gosport	SU602002
Kendall's Wharf, Portsea	SU6703
Woodside, Lymington	SZ321946

Cupressus pisifera **(Sawara Cypress)** is better recorded in recent years. There is a large specimen tree in Minstead churchyard.



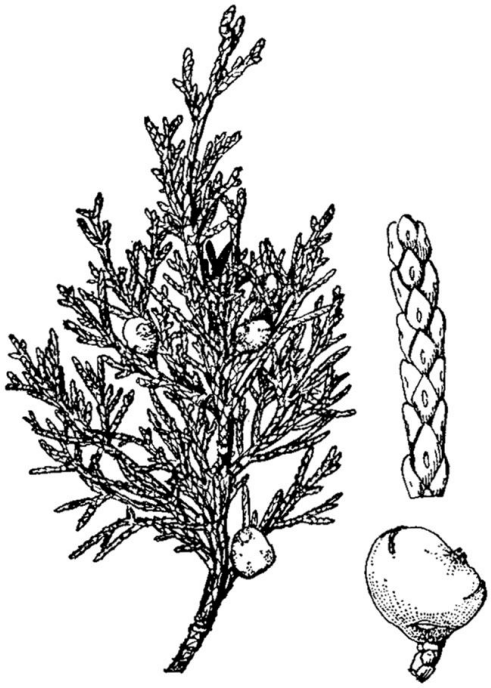
Cupressus sempervirens **(Mediterranean Cypress)** is a rarely recorded planting.

Rhinefield Arboretum area	SU265048
Horseshoe Common roadsides	SZ0991

JUNIPERUS L. (Junipers)

The taxonomy of Junipers has been troublesome for many years, but a reasonable worldwide estimate is of 54 species and a few hybrids – the most of any genus in the Cypress family (*Cupressaceae*). They are distributed across much of the northern hemisphere and down through the African Rift Valley.

Fortunately, much of this complexity is avoidable in Britain, where we have a single species in the wild. However, several Junipers are commonly cultivated and some are capable of regenerating from seed in Britain, so it is worth knowing that the genus breaks down into two sections with very different adult foliage.



Section *Juniperus* (upper picture) has needle-like adult leaves that are jointed at the stem, giving a 'blade and sheath' arrangement that is faintly reminiscent of grasses. The pollen sacs and cones are borne in the axils of leaves on very short branchlets. It is much the smaller of the two Sections, but our native *J. communis* belongs here, as does *J. oxycedrus* which you may have met in the Mediterranean.

Section *Sabina* (lower picture) has scale-like adult leaves that run down onto the stem with no joint; however juvenile leaves are often needle-like and spreading. Pollen sacs and cones are borne at the tips of obvious branches. *J. phoenicea* and *J. sabina* of the Mediterranean fall in this group, as does *J. chinensis* which is the only species in the group so far recorded in Hampshire.

1 Leaves on all shoots free and spine-pointed 2
1' Leaves on some or all shoots scale-like and appressed to shoot 3

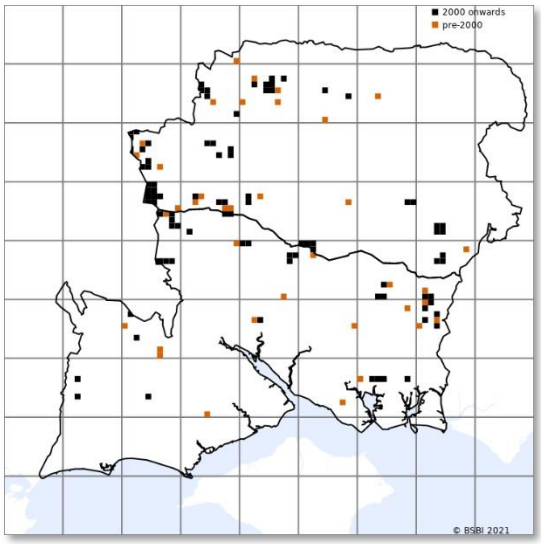
2 Leaves ≥10mm long, ± parallel-sided, spreading or ascending, not densely overlapping; cones with 2-4 seeds ..... ***Juniperus communis*** **(Common Juniper)**
2' Leaves ≤8mm long, usu. widest in lower half or middle, ascending and recurved, densely overlapping; cones with 1 seed ..... ***Juniperus squamata*** **(Himalayan Juniper)**

3 Both forms of leaves present 4
3' Only appressed scale-leaves present 5

4 Spiny leaves on tips of adult shoots and on separate shoots, plentiful; appressed foliage very slender; foliage dark green ..... ***J. virginiana*** **(Pencil Cedar)**
4' Spiny leaves on separate shoots or below appressed leaves on shoot; appressed foliage not slender, dark green with pale margins ..... ***J. chinensis*** **(Chinese Juniper)**

5 Fruit 7-9mm, pale grey-green or glaucous ..... ***J. chinensis*** **cultivars**
5' Fruit 3-5mm, bright deep blue or blue bloomed white ..... ***J. virginiana*** **cultivars**

***Juniperus communis* (Common Juniper)** is widespread on the Hampshire chalk, where it can be found in scrub, downland and along track verges and roadsides. There have been reintroductions from local stock along some major road embankments such as the M3 at Twyford Down and the A3 at Butser Hill. It is particularly plentiful on the fringes of Salisbury Plain and on the South Downs. The most spectacular stands are on the Defence estate, but large populations at publicly accessible places include Old Winchester Hill and Stockbridge Down.

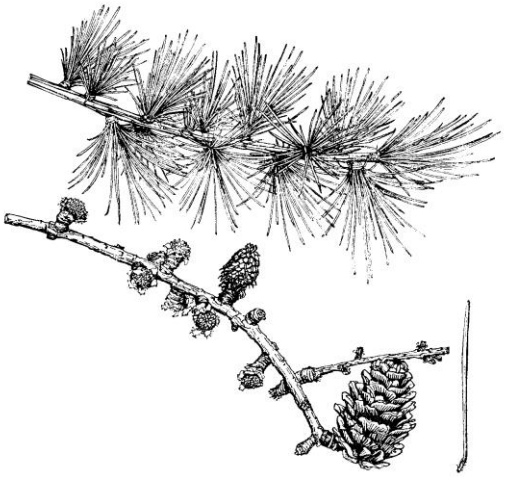


***Juniperus chinensis* (Chinese Juniper)** is recorded only as a rare introduction in Hampshire, in one case as a seedling from a garden plant.

Bournemouth Upper Gardens	SZ0691
Hall Lands, Fair Oak	SU5019

Juniperus virginiana

LARIX Mill. (Larches)



The rarely planted *Pseudolarix* would also key out here. There are 10 Larch species worldwide, most of which are very rare plantings in Britain. We are concerned with two species, one introduced from Europe and one from Japan; and the hybrid between them, which since it arose here spontaneously with only a bit of encouragement from the landowner, could be dubbed a native.

Larches have a classical Boreal-montane distribution in the northern hemisphere and it may seem a bit perverse that while other conifers were happily maintaining an evergreen approach to life in similar conditions, Larches evolved as deciduous trees comparatively recently (50 million years ago) in the high Arctic. One theory is that it was an adaptation to seasonally very low light under much warmer climatic conditions than now. Another intriguing fact is that anatomically and in their DNA, Larches are much more closely related to the evergreen Douglas-firs (*Pseudotsuga*) than to other genera with a closer superficial resemblance.

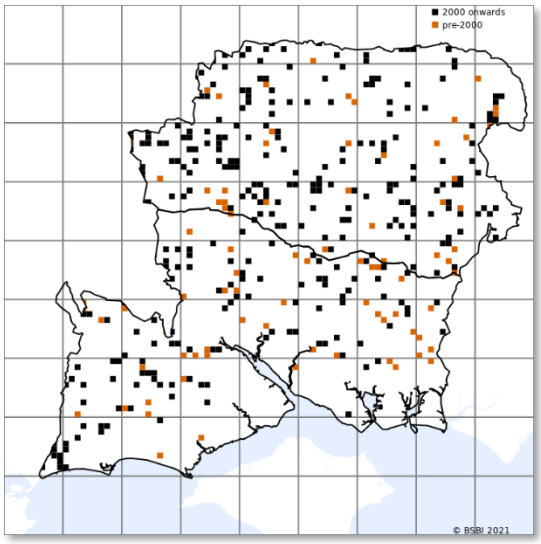
The hybrid is very variable, and it is often difficult to name some specimens to the species at one end of the spectrum or the hybrid.

1 Young twigs yellow to pinkish-brown, hairless, without waxy bloom; leaves up to 40mm or more on leading shoots, up to 30mm long on normal spur shoots, bright green, with indistinct green stomatal bands below only; cones 2-4.5cm long, 1.5x as long as wide, scales convex with upper margins turned in, straight or (on large old cones) slightly turned out
..... ***Larix decidua*** **(European Larch)**

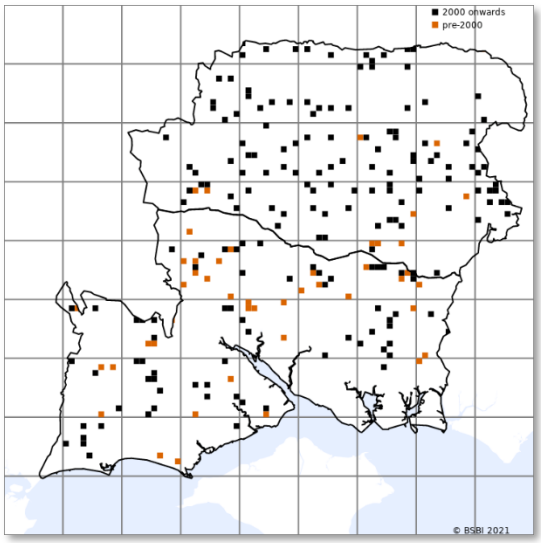
1' Young twigs yellow-brown to pinkish-brown, often slightly hairy, slightly bloomed; leaves up to 50mm long on leading shoots, up to 25mm on normal spur shoots, bluish or greyish green, with grey stomatal bands beneath and sometimes with a scattering of stomata above; cones 2.5-4cm long, appreciably longer than wide, scales turning outwards at tips
..... ***Larix* x *marschlinii*** **(Hybrid Larch)**

1" Young twigs orange-brown to reddish-brown or purple, often slightly hairy, usually with a grey, waxy bloom; leaves up to 60mm on leading shoots, up to 40mm on normal spur shoots, bluish or greyish green, with white or greyish stomatal bands beneath and broken inconspicuous lines of stomata above; cones c. 3cm long, globose or broadly egg-shaped, with scales reflexed at tips and spreading at maturity (rosette-like) ..... ***Larix kaempferi*** **(Japanese Larch)**

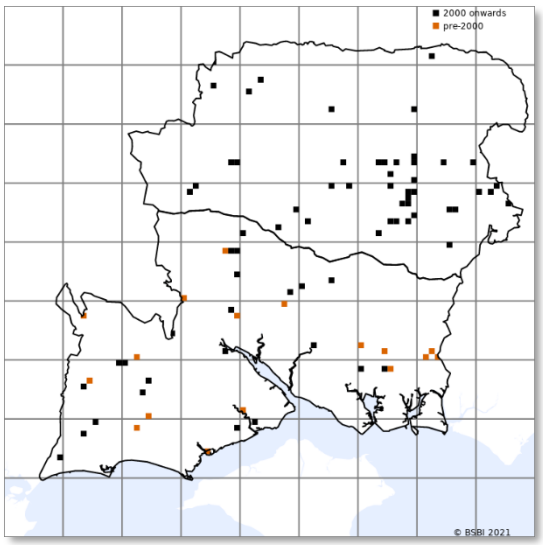
***Larix decidua* (European Larch)** is the species illustrated above. Its place as a forestry tree has largely been supplanted by the Hybrid Larch, but it will still be found quite commonly in Hampshire as block plantings in woodland and as individuals in coverts and shelterbelts, parks and gardens. The block of old records in the north-west of the county, where it has been diligently recorded, suggests the degree to which it has been under-recorded elsewhere.



***Larix* x *marschlinii* (Hybrid Larch)** is probably now the most widely planted tree for forestry, being exceptionally fast-growing. It is almost certainly under-recorded.



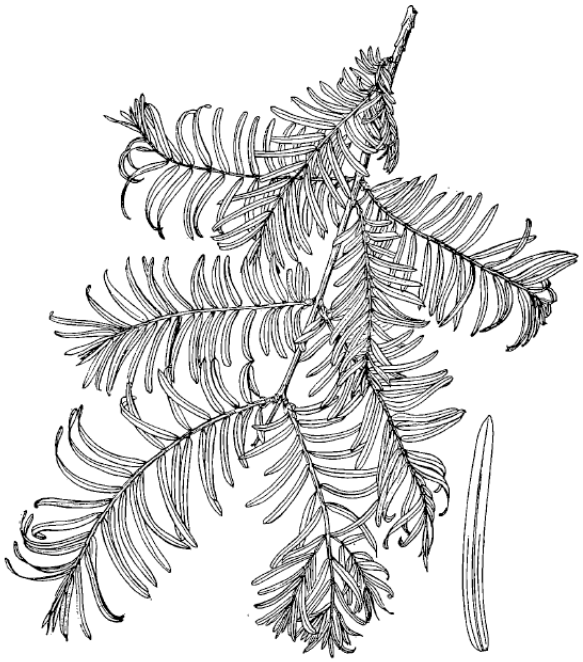
***Larix kaempferi* (Japanese Larch)** has probably not been used as widely in Hampshire as in more western parts of Britain as a forestry tree, but it is often also traded as an ornamental and again, is quite likely under-recorded.



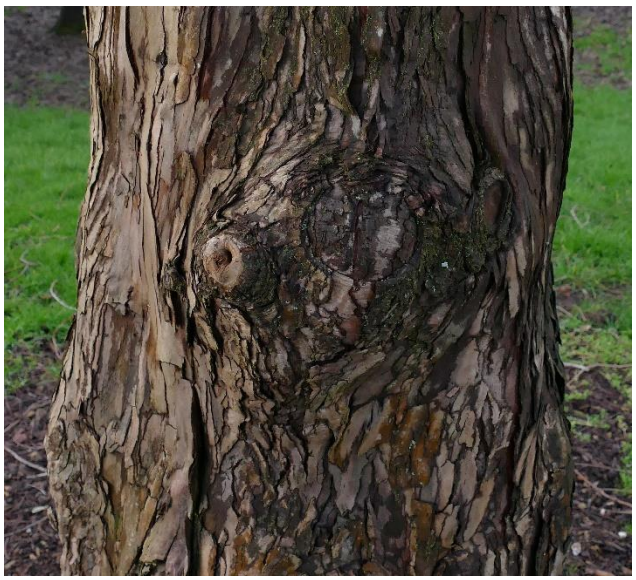
METASEQUOIA Miki ex H.H. Hu & W.C. Cheng (Dawn Redwood)

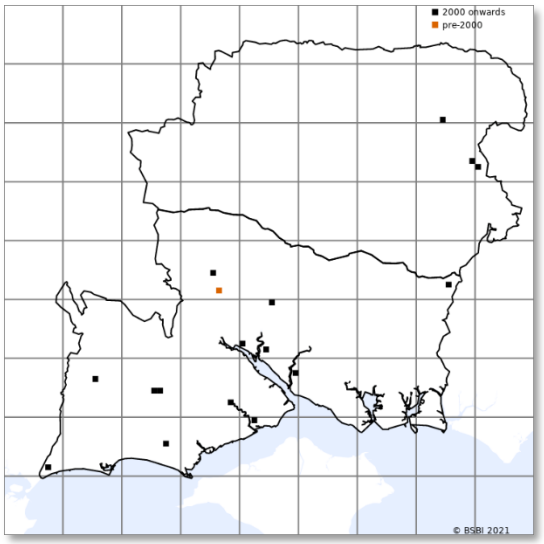
Notable for being a deciduous conifer, this genus now comprises a single species *M. glyptostroboides* and its wild population amounts to a few thousand trees in a very restricted area of China, but in the late Cretaceous and early Tertiary its ancestors occupied huge swathes of the northern hemisphere. It was first found in 1941, described in 1944 and introduced to Europe in 1947-8. This is a fast-growing tree in early stages, but runs out of steam if not planted in a damp position.

The opposite leaves are unusual and distinguish it from *Sequoia* and *Taxodium*.

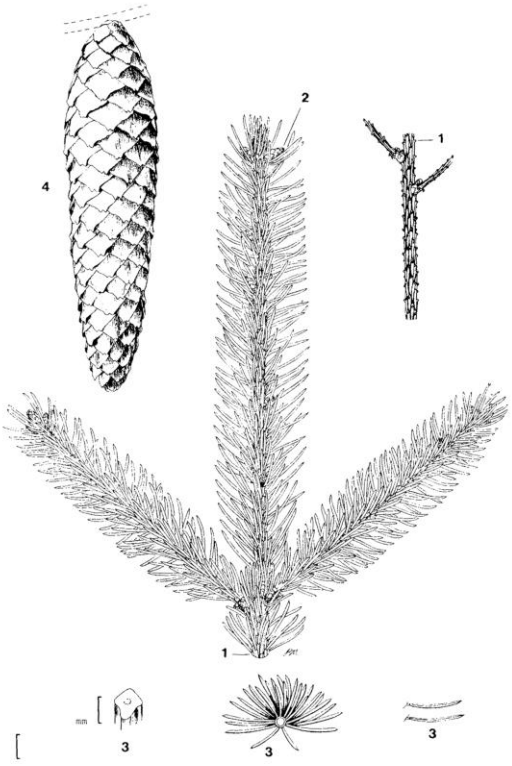


It has a scattered distribution in Hampshire. There is a good specimen in the Hillier Gardens and another at Alice Holt Forest.





PICEA A. Dietr. (Spruces)



There are 29 species of Spruce worldwide, with a northern hemisphere Boreal-montane distribution similar to, but more extensive than, the Larches. We deal with nine species here, being those most likely to turn up outside specialist collections..

Spruces are not the easiest plants to identify, taking the genus as a whole, and it is often difficult to rely purely on stem and leaf characters. Fortunately our two commonest species are easy to separate: Norway Spruce has needles diamond-shaped in cross-section, showing green on both sides with patchy stomata above and faint pale stomatal bands below; Sitka Spruce has flattened needles, with conspicuous stomatal bands below and dark green, occasionally with stomata, above.

If you don't have cones in view, it's not always easy to make a spot distinction between some species of Spruce and some species of Silver-fir (*Abies*). The key is to look at the point of attachment of a needle to its twig. Instead of the (usually green) 'sucker' typical of the latter, you will see a short rather woody peg that arises from the top of a ridge of wood that is fused with the twig and separated from its neighbours by a groove. In different species this twig radiates at varying angles to the twig, from very narrow to about 90°.

1 Needles flattened, with bright stomatal bands on lower side 2
1' Needles 4-angled, squarish or diamond-shaped in cross-section, stomatal bands on lower sides various and at least some stomata on upper side 3

2 Branches ascending or spreading, sometimes drooping at ends in old trees; young twigs hairless; buds (4-)5-10mm long, generally not resinous; needles forward-pointing towards tips of branches, often semi-appressed at base of branches, sharply acute and prickly, dark green above; cones more or less cylindrical to a tapering tip, scales with a wavy edge; scent fruity with banana undertones ..... ***P. sitchensis*** **(Sitka Spruce)**
2' Branches drooping but upswept at ends; young twigs hairy; buds 3-4(-8)mm long, mostly not resinous; needles spreading widely along most or all of branches, tip broad and blunt, yellowish or glaucous green above; cones tapered at both ends, scales shallowly rounded at the ends; scent orangey ..... ***P. omorika*** **(Serbian Spruce)**
2'' Branches drooping dramatically, with long pendent side-branches; young twigs minutely pubescent; buds 5-7(-8)mm long, resinous; leaves forward-pointing and slightly recurved, bluntly pointed, dark green above; cones ±cylindriv but slightly curved, tapering gently at base, abruptly at apex, scales rounded at tip and often recurved towards base of cone; scent resinous, not very distinctive .....***P. breweriana*** **(Brewer's Spruce)**

3 Young twigs hairless, pale pinkish-brown; buds 4-7mm long, acute but rather blunt-tipped, not or slightly resinous; leaves bright green to dark green, with faint pale stomatal bands on underside and patchy stomata on upper side ..... ***P. abies*** **(Norway Spruce)**
3' Leaves bluish or glaucous, with more or less conspicuous whitish stomatal bands on underside..... 4

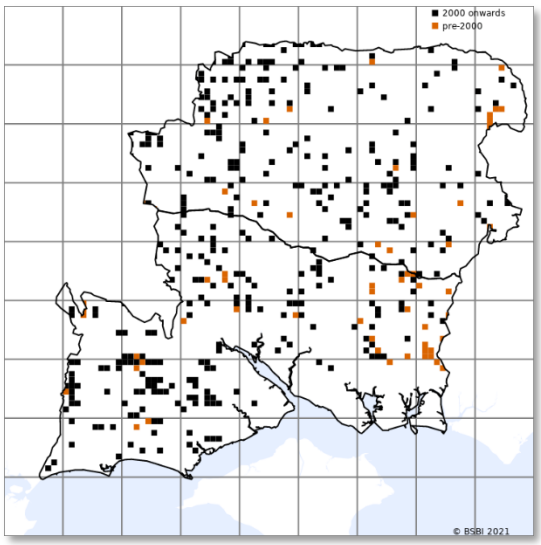
4 Young twigs hairless, tan or greyish; buds 3-4mm, more or less obtuse, not or slightly resinous; leaves 30-50mm, acute ..... ***P. smithiana*** **(Morinda Spruce)**
4' Leaves mostly less than 30mm 5

5 Young twigs hairy (at least sparsely) 6
5' Young twigs hairless 7

6 Young twigs greyish or yellowish-white, hairs often sparse; buds 3-6mm long, obtuse; leaves 15-30mm long, acute ..... ***P. engelmannii*** **(Engelmann Spruce)**
6' Young twigs buff or yellowish-brown; buds 2-4mm long, acute; leaves 6-10mm long, obtuse ..... ***P. orientalis*** **(Caucasian Spruce)**

7 Young twigs yellowish- or reddish-buff; buds 4-6mm long; leaves mostly 10-20mm long, blunt but possibly spiny at tip ..... ***P. glauca*** **(White Spruce)**
7' Young twigs yellowish-brown; buds 5-12mm long; leaves 15-30mm long, acute and prickly at tip ..... ***P. pungens*** **(Colorado Spruce)**

Picea abies **(Norway Spruce)** is by far the commonest planting in Hampshire, and will regenerate. It is used as a forestry crop as well as an ornamental (although, to be honest, it is one of the least ornamental species). Being until recently the most popular "Christmas tree" it often appears in suburban gardens where on occasions it now makes a substantial tree.



Picea breweriana **(Brewer's Spruce)** is known only from a couple of plantings in Hampshire.

Rhinefield Arboretum area	SU265048
Weston Common	SU6944

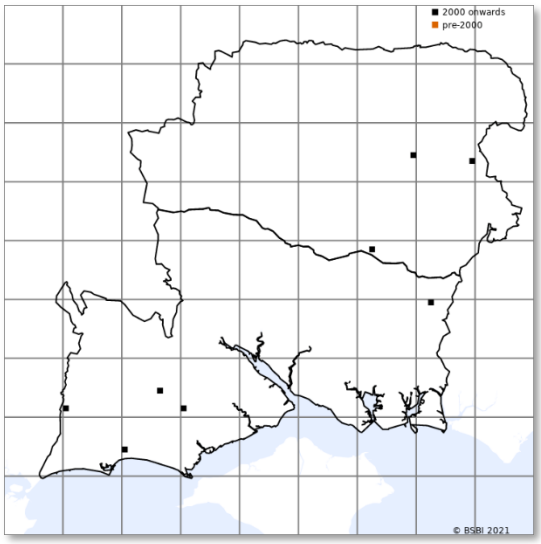
Picea engelmannii **(Englemann's Spruce)** so far has only a couple of records in Hampshire, but as it is now one of the alternative Christmas trees it may turn up. It has been used as an experimental forestry planting and in shelter-belts in the West. It somewhat resembles *P. pungens*, but the presence of hairs on the young twigs and the lack of prickliness in the foliage help to distinguish it.

Rhinefield Arboretum area	SU264048
John Lewis farms, Leckford	SU397376

Picea glauca **(White Spruce)** is yet another species found in experimental forestry planting and in shelter-belts in the West. In Hampshire, however, it is only recorded from specimen plantings in a couple of spots.

Rhinefield Arboretum area	SU265047
Alice Holt Lodge	SU8042

Picea omorika **(Serbian Spruce)** is more widely used in small-scale forestry in Britain; there is a smattering of plantings noted in Hampshire so far.



Picea orientalis **(Caucasian Spruce)** is only recorded from a few plantings in Hampshire. There is a fine tall tree at the back of Ampfield churchyard.

Exbury	SU4200
Ampfield	SU407235
Lodge Inclosure, Alice Holt	SU7943

Picea pungens **(Colorado Spruce)** is almost exclusively known from the cv. 'Glauca' ('Blue Spruce'), which is a popular ornamental and now also being grown as Christmas trees. Worth looking out for, although there are only a few records for Hampshire as yet. As well as the one listed, unlocalised records come from Highclere and Shroner

Marwell	SU5021

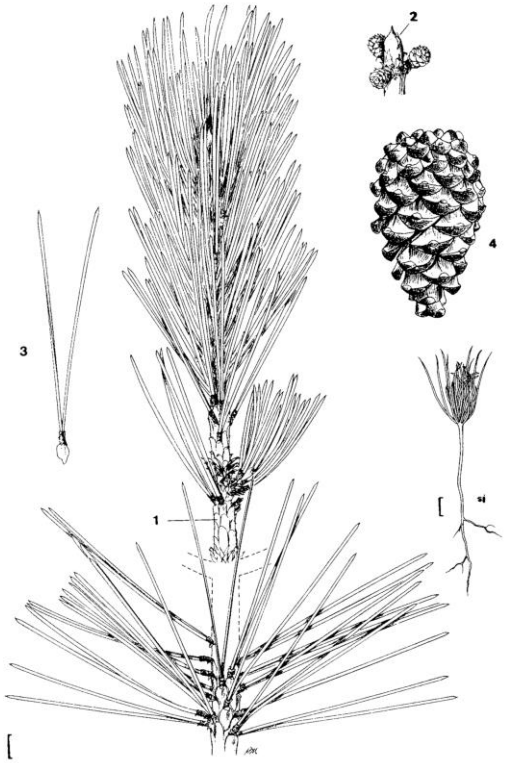
Picea sitchensis **(Sitka Spruce)** is of course planted on a vast scale as a forestry tree in western and upland Britain. Although recorded widely in Hampshire, it is much less plentiful than Norway Spruce, and only seriously used as a crop tree in parts of the New Forest. It regenerates frequently. There are notable specimen trees at Bolderwood.

Picea smithiana **(Morinda Spruce)** is a species unlikely to be found outside dedicated collections, as it is very frost-sensitive for the first few years of its life. However, there is a notable specimen tree at Bolderwood as well as the two listed.

PINUS L. (Pines)

With around 100 species, Pines are one of the big conifer families of the world. Fortunately, we are only going to have to consider a dozen of them in the Hampshire countryside, and as usual there are just a few widespread species and a larger number that you will rarely meet outside collections and gardens.

Pines are distinguished by their grouping of needles on short shoots, each group ensheathed in a more or less prominent set of papery bracts. For identification purposes, the species divide rather neatly by the number of needles in a bunch. World-wide, the maximum is 8, but you are unlikely to see other than 2, 3 and 5; however, some species are quite good at producing a minority of bunches with different numbers from the textbook, and young plants will have needle singly. Moral: look at several short shoots on different branches in cases of doubt.



1 Needles in 2s 2
1' Needles in 3s 9
1" Needles in 5s 10

2-needled

2 Most leaves >10cm 3
2' Most leaves <10cm 6

3 Upper bud scales with strongly downcurved free tips 4
3' Upper bud scales not downcurved, pressed to bud or enclosed in resin 5

4 Crown low-domed, umbrella-like; leaves 10-15cm, dark green; ♀ cone ovoid-elliptical with broadly rounded apex; cone-scale with 5 slender radiating ridges ..... ***Pinus pinea*** **(Stone Pine)**
4' Crown high-domed; leaves 15-20cm, pale grey-green; ♀ cone narrow when closed, highly asymmetrical at base, ±conic at apex; cone-scales with one broad transverse ridge and central small prickle ..... ***P. pinaster*** **(Maritime Pine)**

5 Foliage very gaunt with long bare branches below the leafy apex; needles stiff; ♀cones borne in whorls, retained on tree for many years, 5-9cm long, very asymmetric at base; cone-scales with a prominent spine (wearing away with age), those on the outer side with a strongly conical tip ..... ***P. muricata*** **(Bishop Pine)**
5' Foliage at most moderately gaunt; needles flexible; cones 4-8cm long, not strongly asymmetric at base; cone-scales with transverse ridge and very short spine ..... ***P. nigra*** **(Black Pine)**

6 Upper part of trunk orangey-red, lower part metallic grey with reddish furrows; leaves 4-10cm long, glaucous, always with a twist, 2-3x as broad as high, with 6-10 or more resin canals just under the leaf surface; cone scales without a prickle on outer face ..... ***P. sylvestris*** **(Scots Pine)**
6' Trunk grey-brown or red-brown, usually varying little (or going pinkish-grey) from bottom to top; leaves green, twisted or not; cone scales with at least a stubby prickle on outer face 7

7 Trunk reddish-brown to low down, becoming blackish-brown with age; leaves 3-7cm long, dark green or yellowish green, distinctly twisted, with usually 2 resin canals deep within leaf; cone scales with a slender prickle .....***P. contorta*** **(Lodgepole Pine)**

7' Leaves no more than slightly twisted; cone scales with a very short stout prickle 8

8 Shrub or (**subsp. *uncinata*)** small tree, many-branched from low down; buds obtuse or barely acute; leaves not more than 8cm, with resin canals just under leaf surface; cones up to 5cm .....***P. mugo*** **(Dwarf Mountain-pine)**

8' Single-trunked tree; buds acuminate; leaves often >8cm, with resin canals embedded in leaf; cones up to 7cm.....***P. nigra*** **(Black Pine)**

3-needled

9 Trunk dark greyish-brown with reddish-brown furrows and fissuring to ridges in mature trees; leaves 10-15cm, bright green, usually not more than 1mm wide; cones 10-12cm long by 8-9cm wide, on a curved stalk and very distended on one side, forming dense persistent clusters pointing backwards or downwards on the branch, scales lacking spine .....***P. radiata*** **(Monterey Pine)**

9' Trunk yellowish- to reddish-brown, fissuring to large rectangular plates in mature trees; leaves 10-25cm, dull green, up to 2mm wide; ♀ cones 7-9(-15)cm long by 4-5cm wide, not or slightly distended on one side, falling early and not forming dense persistent back-pointing clusters, scales with a short spreading spine ..... ***P. ponderosa*** **(Western Yellow-pine)**

5-needled

10 Shoot with long and dense pubescence hiding shoot, red-brown or orange; leaves 5-8(-13)cm long, stiff; cones ovoid, not opening widely before disintegrating to release seeds; cone-scales fan-shaped with a thickened ±fleshy tip; seeds unwinged or with a narrow rudimentary wing .....***P. cembra*** **(Arolla Pine)**

10' Shoots with minute hairs at base of short shoots (soon lost); leaves 6-10cm long, flexible but usu. in a tight bundle especially in the first year; cones ±cylindrical, tapering at both ends, opening widely to release seeds; tips of cone-scales not prominently thickened, tending to curve out; seeds with persistent wing 18-25(-30)mm long .....***P. strobus*** **(Weymouth Pine)**

10'' Twigs entirely glabrous; leaves (6-)7-18(-23)cm long, stiff or flexible; cones ±cylindrical and parallel-sided for larger central part, opening to release seeds; cone scales distinctly thickened at tip, mostly straight or slightly incurving 11

11 Leaves 7-12cm, ±stiff, angled towards tip of shoot especially when young, outer surface deep blue-green; ♀ cones 8-15cm long, scale tips slightly incurving ..... ***P. peuce*** **(Macedonian Pine)**

11' Leaves 8-20(-23)cm, flexible, ±drooping, outer surface usu. a light bright green, occ. darker green; ♀ cones up to 25cm long, scale tips straight or slightly outcurving at base of cone .....***P. wallichiana*** **(Bhutan Pine)**

Pinus cembra **(Arolla Pine)** is as yet unrecorded in Hampshire, but it has been recorded in two neighbouring counties as a planted tree.

***Pinus contorta* (Lodgepole Pine)** is a rarely planted tree in Hampshire, although used widely in forestry in the wetter western parts of Britain. It regenerates at Alice Holt. It may be elsewhere, and if you spot a Scots Pine near-lookalike with even shorter, greener needles and a darker reddish trunk overall, it is worth taking a second look.

***Pinus mugo* (Dwarf Mountain-pine)** is unlikely to be mistaken for any other pine outside major collections. There are just a couple of records for Hampshire in the wider countryside, but it is used elsewhere as a shelter shrub for young plantations, and there are some dwarf garden forms, so it may occur.

Moors Valley Country Park	SU104059
Heath Warren, Eversley	SU760612

***Pinus muricata* (Bishop Pine)** is another rare Hampshire planting.

Alice Holt Forest	SU797430
Heath Warren, Eversley	SU766606
Old Milton cemetery area	SZ2394

***Pinus nigra* (Black Pine)** occurs in two subspecies.

Trunk with tendency to fork towards crown, especially when damaged, or to lean; wide crown when growing in the open, with long side-branches; trunk dark brown or blackish; leaves 8-12cm (sometimes more), dark green, fairly stiff (thick-walled cells below leaf surface)
.....**subsp. *nigra* (Austrian Pine)**

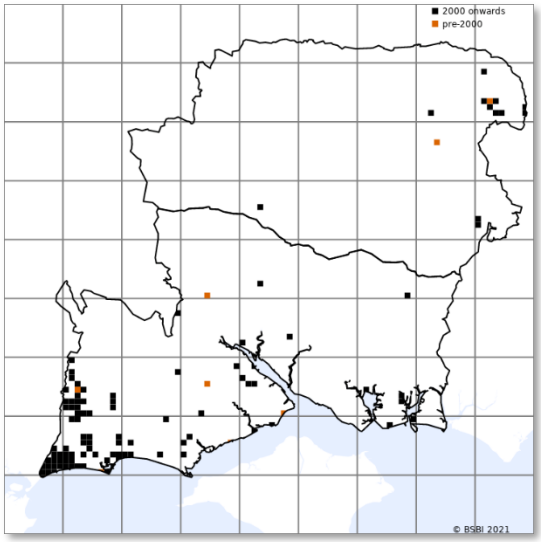
Trunk usually strikingly straight and erect, forking only when damaged and then erect from fork; crown narrow with short side-branches; trunk grey often with dull pink tones; leaves 10-18cm, bright green, somewhat flexible (thin-walled cells below leaf surface)
..... **subsp. *laricio* (Corsican Pine)**

There was some early experimentation with Austrian Pine in Britain as a forestry tree, but its branching habit makes it less than ideal, and the commonly planted crop tree is now Corsican Pine, of which there are extensive stands in the New Forest and elsewhere. Nevertheless, Austrian Pine can be found widely in shelterbelts and parklands. The following map of Austrian Pine probably indicates significant under-recording, since the species itself is much more widely and frequently recorded throughout the county. There are no indications of Austrian Pine regenerating in Hampshire, although Corsican Pine appears to do so.

Corsican Pine often appears in forestry plantations alongside Scots Pine, where its bark colours mark it out; also the foliage, with generally longer needles that are more crowded together at the ends of branches, has a rather gaunt, bunched look.

***Pinus peuce* (Macedonian Pine)** is unrecorded as yet in the Hampshire countryside but it is likely to occur in plantings and is included to eliminate possible confusion with other 5-needled pines.

Pinus pinaster **(Maritime Pine)** is a fairly frequent planting in Hampshire on the lighter sandy soils, being a particular feature of the Bournemouth landscape. There are specimen trees at Exbury and Bolderwood. It can regenerate from seed on heathland. Its long needles combined with slender (Spruce-like in outline), shiny, tan-brown cones mark it out from other 2-needled Pines.



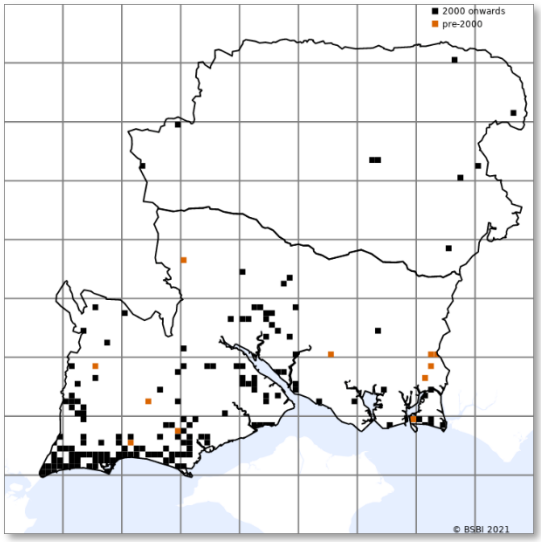
Pinus pinea **(Stone Pine)** is recorded as an amenity planting in a couple of spots right on the coast. It has been seen recently in Southsea as well as the site given here.

Ferry Road, Hayling	SZ692997

Pinus ponderosa **(Western Yellow-pine)** is another species not yet recorded in the wider Hampshire countryside, apart from a specimen tree at Blackmoor, but there are a couple of recorded specimen plantings and it is the only 3-needled Pine other than Monterey Pine likely to be encountered.

Rhinefield Arboretum area	SU263048
Lodge Inclosure, Alice Holt	SU7943

Pinus radiata **(Monterey Pine)** is the 3-needled Pine that will be seen most in Hampshire, at least in the south. It makes a domed crown, sometimes very broad, and with its chunky cones clustered on the branches, is often recognisable from a distance.

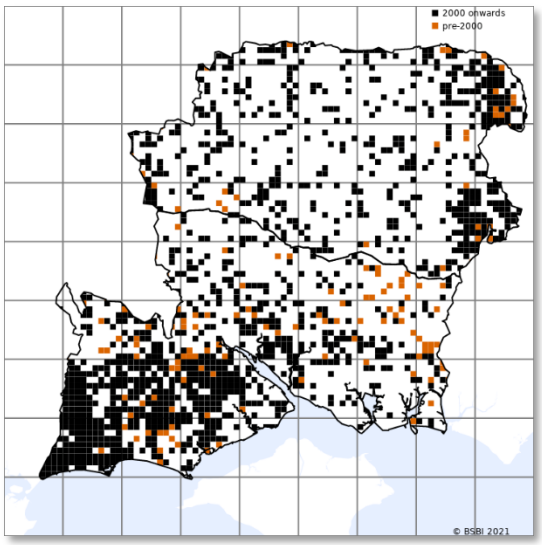


Pinus strobus **(Weymouth Pine)** is the 5-needled Pine you are most likely to see outside gardens and collections. It was experimented with as a forestry tree in the 19th century, but proved very susceptible to Blister Rust and planting was abandoned. Old specimens from this period survive in Puckpits Inclosure and

Millersford Plantation, Hale	SU189176
Dames Slough Inclosure	SU2505
Puckpits Inclosure	SU2509
Slufters Inclosure	SU231104
E of Litchfield	SU480538
Lodge Inclosure, Alice Holt	SU7943
Winton Recreation Ground	SZ0993

there are specimens at Rhinefield. The needle count and the narrow ripe cones with splayed scales are distinctive.

***Pinus sylvestris* (Scots Pine)** will be a familiar and ubiquitous tree, apparently tolerant of all soils except the most waterlogged.



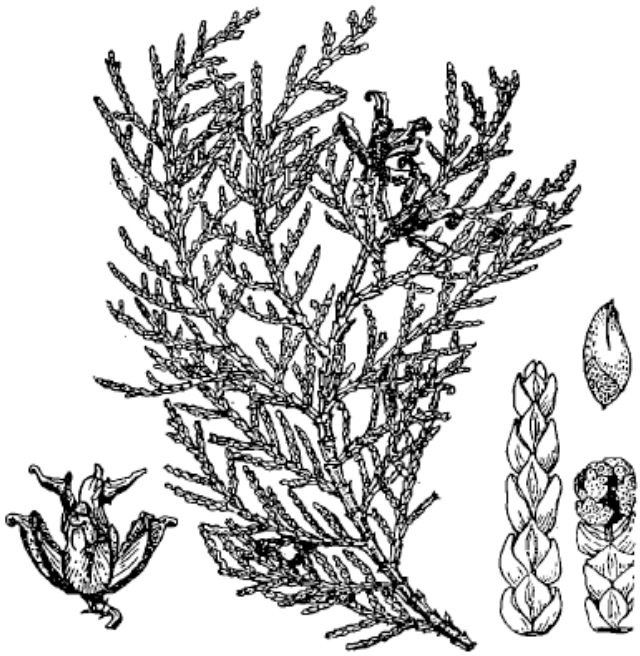
***Pinus wallichiana* (Bhutan Pine)** is a rather popular ornamental planting. Its long, slender, drooping leaves in 5s and its large narrow cones mark it out from most species other than the rarely introduced but collectable Mexican White Pine *Pinus ayacahuite*.

Bitterne Park, Southampton	SU443138
Swayhling, Southampton	SU4415
Horton Heath	SU496170
Casle Lane East, Littledown	SZ1293
Holdenhurst Sewage Works	SZ1395

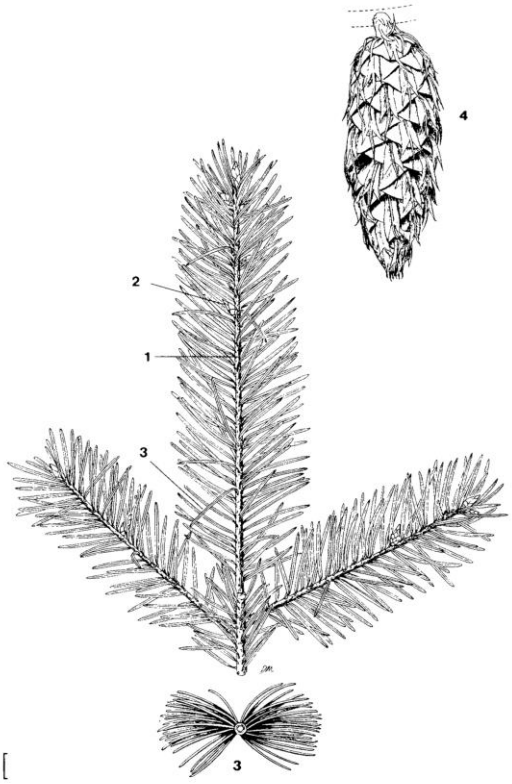
PLATYCLADUS Spach (Chinese Thuja)

This is a genus with one species *T. orientalis* in China and Korea. It used to be placed in *Thuja*, but molecular analysis now shows that it is more distantly related to *Thuja* than some other genera that are morphologically more distinct. The erect shoots and strongly hooked cone-scales make it distinctive.

There are no records for Hampshire.



PSEUDOTSUGA Carrière (Douglas-firs)

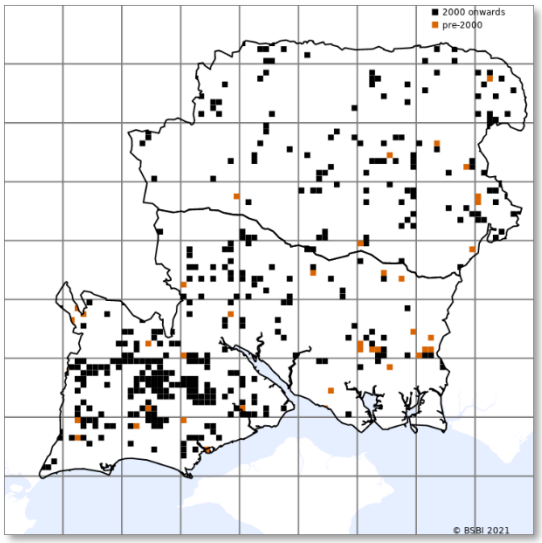


There are four species of *Pseudotsuga* worldwide, but only one that you are at all likely to see in the wider countryside: ***Pseudotsuga menziesii* (Douglas-fir)**. There is a specimen of the Bigcone Douglas-fir *P. macrocarpa* at Chandlers Ford, which is indeed distinguished by its larger cones (10-20cm long).

If you can get a cone, you will have no difficulty in recognising this tree from the bracts like forked tongues poking out between the cone scales. The foliage is similar to a Silver-fir but the leaf runs down to a much smaller sucker-like appendage on the stem. The bud is brown, shiny, close-packed and sharply acute at the tip – more like a Beech bud than any Silver-fir or Spruce. The scent is a delicious combination of resinous and tangerine-fruity; standing in a Douglas-fir plantation on a warm spring day is a delight for the non-allergic nose.

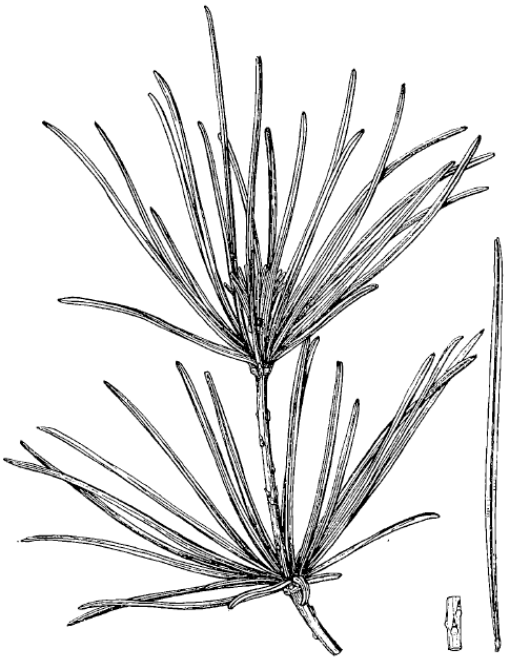
The wide variation in needle length between different clones may cause confusion at first, but the buds will clinch a determination.

Douglas-fir is one of the most widely planted conifers in the county, as a forestry tree, as a shelterbelt planting and as an ornamental. Old trees can be magnificent, and there are good ones at Bolderwood, Rhinefield and Puckpits.



SCIADOPITYS Siebold & Zuccarini (Umbrella Pine)

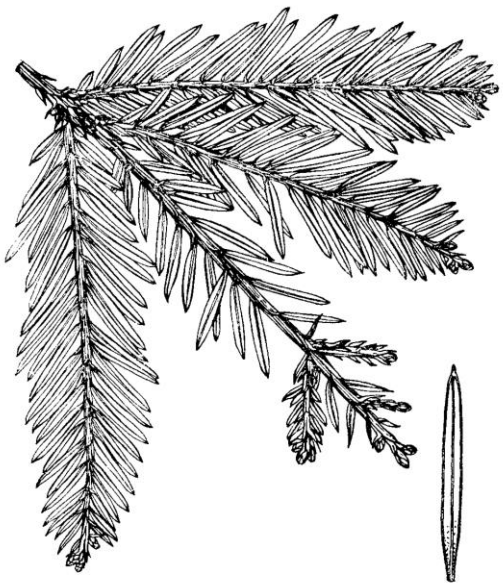
There is a single member of this family worldwide, *Sciadopitys verticilla* (Umbrella Pine), native to Japan. With its two-ranked whorls of long needle-like leaves there is nothing else that resembles it. Strictly, the leaves should be referred to as cladodes (shoots that function like leaves). Its evolutionary history is obscure.



It is recorded only as a single planted tree on the margins of a Forestry Commission settlement at Ampfield Woods.

Ampfield Woods, Knapp	SU408241

SEQUOIA Endl. (Coastal Redwood)

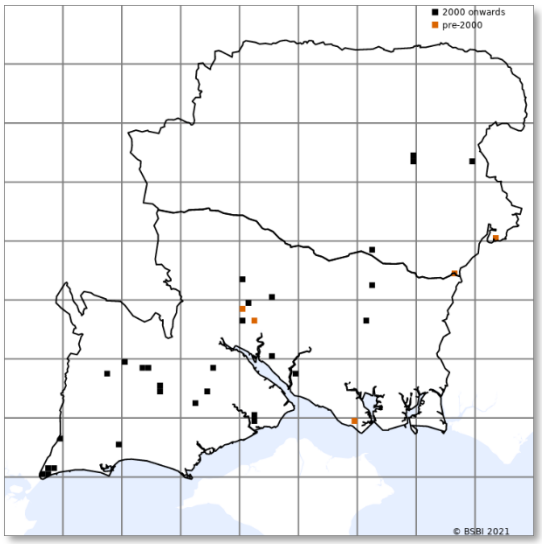


There is just one species worldwide. *Sequoia sempervirens* (Coastal Redwood) has the tallest individual trees known in the world, at 112 metres, but there is nothing in Britain on that scale yet. It is also one of the few conifers that can be coppiced. At Leighton near Welshpool, where there is a sizeable grove of this species, substantial trees can be seen growing in lines from the fallen trunks of wind-thrown individuals.

Illustrations might suggest that the foliage resembles Spruces or Silver-firs, but it is really very distinctive. First there is the presence of very narrowly tapering scale-leaves on the leader shoots and on the more mature main stems. At the bases of side shoots you may find leaves intermediate between tapering and parallel-sided leaves, but most of the side shoot is occupied by ranks of spirally mounted but flattened-out parallel sided leaves tapered at both ends. These are hard, rather spiky and rather crowded on the shoot. They are longer, or at least more widely spreading, at the middle of the shoot and shorter at each end, so that each side-shoot spray has a narrowly elliptical outline.

Cones up to 3.5cm long are borne singly towards the end of foliage twigs, and at maturity the scales widen at the tip into a broad face with a strong furrow, like a pair of puckered lips. The trunk is orangey- or reddish-brown and stringy.

Quite widely planted in Hampshire. There are good specimen trees at Bolderwood and Herriard Park.



SEQUOIADENDRON Buchholz (Wellingtonia)

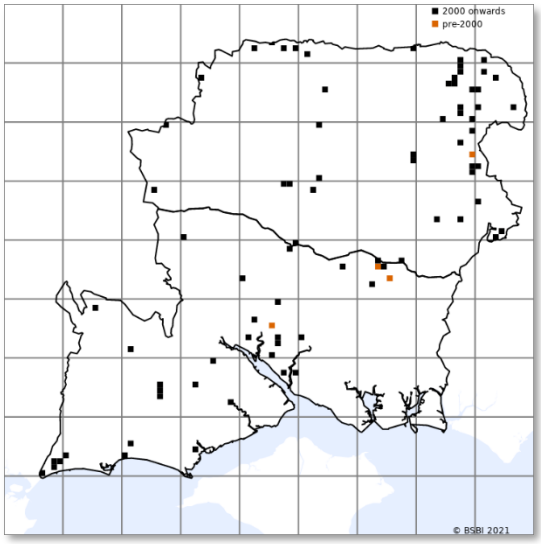
This is yet another genus with one species worldwide.

***Sequoiadendron giganteum* (Wellingtonia or Giant Redwood)** produces the biggest, if not quite the tallest, trees in the world. It became an enormously fashionable planting after its introduction to Britain in the mid 1850s, and can be found in almost any situation spacious enough to take it (and quite a few that aren't).

First treated as a member of *Sequoia*, it was split off rather controversially in the mid 20th century. Now the DNA evidence supports the morphological and anatomical grounds for making it separate. Certainly the mature foliage is very different, with leaves densely packed in a spiral; spreading tips on leaves of young trees become incurved on more mature specimens. The bark is spongy rather than stringy, although there are clones where this is not very apparent.

The cones, though larger than those of Coastal Redwood (up to 4.5cm long, but in wild stands up to 9cm), are very similar, with a fissured apex to the scale resembling puckered lips. They are also borne singly but tend to bunch more closely along the main twig.

Specimen trees can be seen at Bolderwood, Rhinefield, Highclere and Stratfield Saye but good-sized trees are not hard to come by in many parts of the country, especially where one of the larger local landowners became a Wellingtonia enthusiast in the 19th century.



TAXODIUM L. Richard (Swamp Cypress)

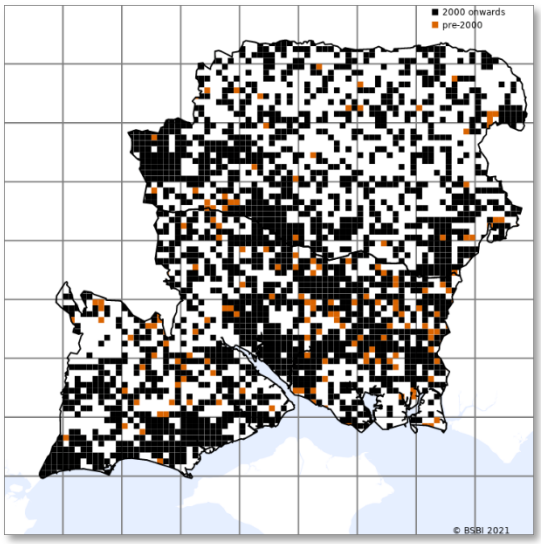
A genus of two species from the southern United States, Mexico and Guatemala. *T. distichum* is the only one likely to be seen outside specialist collections; the climate is not really suitable for *T. mucronatum*. It is unusual in its deciduous foliage and differs from *Metasequoia* by its spirally or alternately arranged leaves and by cone differences.

In Hampshire it is now quite popular as an amenity planting, as well as being found in collections and parks.

TAXUS L. (Yews)

If one ignores the form of the seed surround, then a number of other genera with green buds and first year shoots may key out here. They include *Cephalotaxus* (Plum-yews), *Podocarpus* (Yellow-woods, a large genus of mostly tropical and southern hemisphere plants) and *Saxegothaea* (Prince Albert's Yew). *Torreya* (Nutmeg-yews) are very Yew-like but tend to have buds that are green only on the lower side, and with some brown bud-scales encircling the bud. However they all have at least one small resin canal in the leaf. None are very likely to be met with outside specialist collections.

The genus comprises 8 species and a couple of hybrids worldwide, separated mostly on leaf dimensions and consequently quite a critical and disputed group.

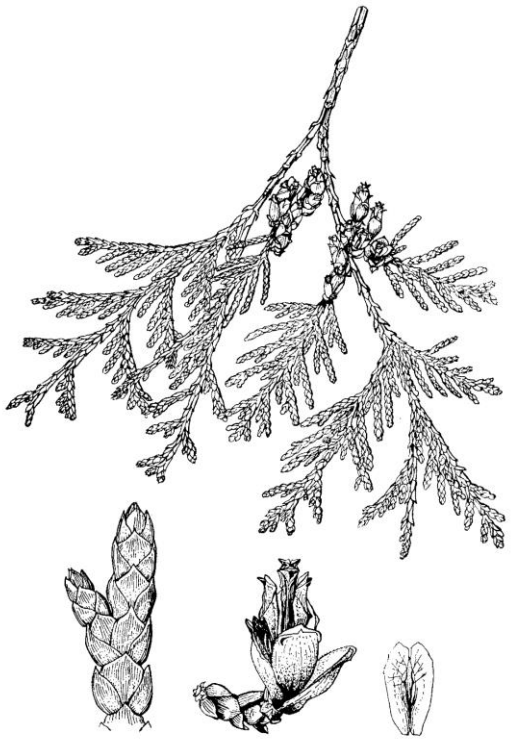


Fortunately, you are unlikely to meet any other than our native ***Taxus baccata*** **(Common Yew)** outside specialist collections. This is both widespread and common in Hampshire as a native and a planting, and sometimes known as the "Hampshire Weed". It is pretty tolerant of all but the most waterlogged soils; and is quite a common woodland constituent in the New Forest.

The most impressive Yew woods in the county are probably those on Oxenbourne Down on the southern slopes of Butser Hill. There are smaller but atmospheric stands in many places, such as Beacon Hill at Ashley west of Farley Mount. Everyone should visit the great woodlands just beyond the county at Kingley Vale (north of Chichester) and Great Yews (Odstock, south of Salisbury) at least once in their lives. Woodland dominated by Yew is a rare type of vegetation in Europe, and Britain has the finest examples.

There are many fine churchyard Yews in the county and it is impossible to list them all. Farringdon has a reputation for being very venerable. The Yew avenue at Chilton Candover is impressive, and probably planted in the 17th century. I am particularly fond of the three veterans at Hawkley. If you want to go hunting, try the Web site: http://www.ancient-yew.org/

THUJA L. (Red-cedars)



There are a few other genera here that may be confused. *Platycladus* (Oriental Arbor-vitae) used to be placed in *Thuja*, although it is not that closely related. It has no scent, and the underside of the spray is the same green colour as the upperside. Flattening of the sprays is typically in a vertical axis. The more closely related *Thujopsis* (Hiba Arbor-vitae) has a very broad scale-leaf which is particularly boldly marked with white underneath, giving it a very distinctive appearance. The cones are small, and as broad as wide. Both these are single-species genera and only likely to be met with in plantings, although these include garden and amenity plantings as well as collections.

Calocedrus (Incense-cedars) have a strong scent often described as similar to shoe-polish, although it seems pleasanter than that to me, and more like pencil-shavings. (One species was used for pencils.) *Calocedrus* cones comprise three pairs of scales *(Thuja* has 4-6), of which only the middle pair is seed-bearing. The free, pointed tips of the leaves give the spray a rather angular, geometrical look.

Foliage of *Thuja* may be confused with some varieties of *Cupressus lawsoniana* (Lawson Cypress); if female cones are present, they can be easily distinguished. In any case, *Thuja plicata* leaves are stiffer, shinier and more leathery than *C. lawsoniana* and both *Thuja* species have a rich fruity scent very different from the rather sour parsley odour of *C. lawsoniana.*

Thuja itself is made up of five species, only two of which need concern us here.

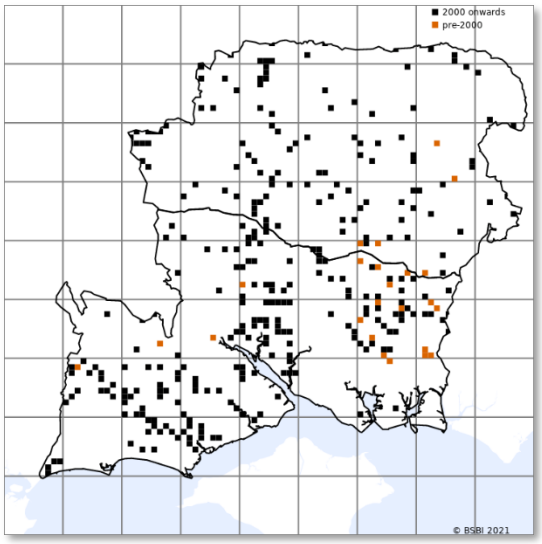
1 Leaves dark green on upper sides of sprays, with whitish stomatal patches on underside; strong scent of pineapple or pear-drops ..... ***T. plicata*** **(Western Red-cedar)**

1' Leaves yellowish-green with paler yellowish stomatal patches on underside; scent more reminiscent of apples ..... ***T. occidentalis*** **(Northern White-cedar)**

Thuja occidentalis **(Northern White-cedar)** has a single Hampshire record to date, although it is almost certainly overlooked, as it is sold as a hedging and garden plant, and Mitchell (1972) says "common nearly everywhere".

Woodside, Lymington	SZ322947

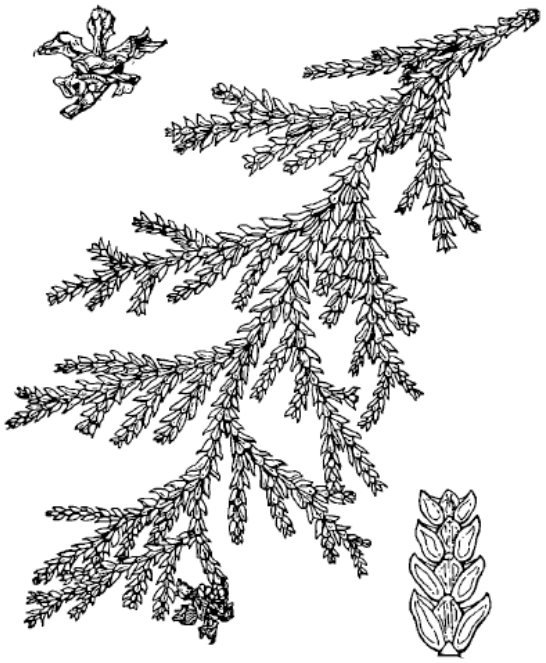
***Thuja plicata* (Western Red-cedar)**, on the other hand, is very widely used in forestry (often as a so-called "nurse tree" for hardwood plantations), shelterbelts, screens and hedging, including garden hedging. It regenerates abundantly.



Thuja plicata

THUJOPSIS P. Siebold & Zuccharini (Hiba)

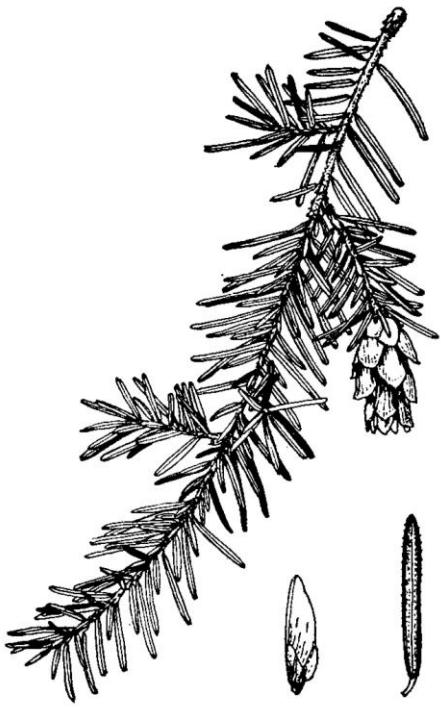
This genus has a single species *T. dolabrata* native to Japan. It requires humid growth conditions although it can survive in shallow and dry soil and grows very slowly. The texture and overlapping of scales on the branches are often said to resemble reptilian scales, and the large bright white patches on leaf undersides are arresting.



Only recorded in one place in Hampshire.

Bournemouth Upr Gdns SZ0691, SZ0692

TSUGA (Antoine) Carriere (Hemlocks)



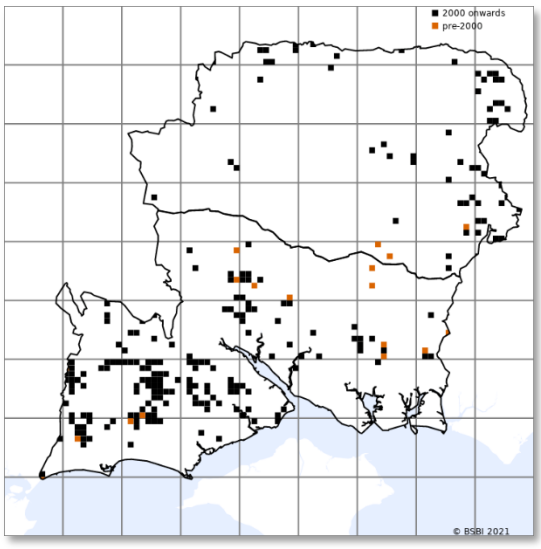
Even without the diagnostic characters, Hemlocks can usually be fairly easily recognised by their rather trim little leaves (finely toothed along the edges) that are very obviously of varying lengths, with the shorter often sticking out rather waywardly from the general plane of alignment and pointing upwards or even backwards. Eight species are recognised world-wide; only a couple are considered worth treating here, although it may also be worthwhile looking out for a third species, *Tsuga mertensiana* (Mountain Hemlock), that has certainly been planted in Surrey. This has much larger, more Spruce-like cones and glaucous foliage that spreads more whole-heartedly around the twig. Its needles are plumper and have stomata both sides, unlike any of the other species. DNA confirms that despite the morphological differences, it belongs with the other Hemlocks.

Arched leading shoot; winter buds pointed; leaves short (often little more than 10mm), tapering slightly towards tip, with narrow white stomatal bands beneath (5-6 lines of stomata); scent reasonably pleasant (lemony) ..... ***T. canadensis*** **(Eastern Hemlock)**
Strongly drooping leading shoot; winter buds bluntly rounded; short leaves about 5mm long, longer leaves up to 20mm or a little more, parallel-sided, with broad white bands beneath (8-10 lines of stomata); scent rather sour (like its namesake) ..... ***T. heterophylla*** **(Western Hemlock)**

Tsuga canadensis **(Eastern Hemlock)** has a single record as yet in the broader Hampshire countryside, but it is sold as a garden tree, particularly in smaller and slow-growing cultivars.

Town Common, Christchurch SZ1496

Tsuga heterophylla **(Western Hemlock)** is planted as a forestry tree, where it appears frequently in Forestry Commission and private plantations, as well as a specimen tree – mostly on the more acid soils. Unlike most of the genus it is reasonably good for carpentry as well as pulping, but it is prone to Butt-rot *Heterobasidium annosum*, especially when planted into ancient woodland sites; some might say a fate richly deserved. For this reason it has fallen out of favour to some degree, but it regenerates very readily from seed.



OTHER GENERA RECORDED AS HARDY PLANTINGS IN BRITAIN

Araucariaceae

Wollemia	Wollemi Pine

Cupressaceae

Athrotaxis	Tasmanian Cedars
Austrocedrus	Chilean Cedar
Callitris	Cypress-pines
Cunninghamia	Chinese Firs
Diselma	Cheshunt Pine
Fitzroya	Alerce
Glyptostrobus	Chinese Swamp Cypress
Libocedrus	Incense Cedars
Microbiota	Subalpine Arbor-vitae
Taiwania	Taiwan Redwood
Widdringtonia	South African Cedar

Pinaceae

Keteleeria	Keteleeria
Nothotsuga	Bract Hemlock
Pseudolarix	Golden Larch

Podocarpaceae

Dacrydium	Ru
Halocarpus	Pink Pine
Phyllocladus	Celery Pine
Podocarpus	Podocarps
Saxegothaea	Prince Albert Yew

Taxaceae

Cephalotaxus	Plum Yews
Pseudotaxus	White-cup Yew
Torreya	Nutmeg Yews

FURTHER READING

Eckenwalder, J E (2009), *Conifers of the World*, Timber Press, London.
If you want to put your local conifers into a global perspective, this is a nice book (albeit quite expensive, and with a few shortcomings) with an account of every species. Quite a lot of anatomical detail is included, which helps to supplement the more usual recognition clues that sometimes don't go all the way.

Edwards, D. & Marshall, R. (2019), *The Hillier Manual of Trees and Shrubs*, RHS, London.
It includes a 70-page account of species in cultivation, with species descriptions and notes on the often baffling range of cultivars.

Farjon, A (2008), *A Natural History of Conifers*, Timber Press, London.
A good introduction to the subject, although for the general reader a bit overloaded on taxonomy and cladistics, and a bit short (and occasionally factually shaky) on biology.

Farjon, A (2010), *A Handbook of the World's Conifers*, Brill Academic Publishers, Boston.
This is a heavyweight in every sense – two huge volumes costing nearly £200, with detailed descriptions of every species known. The author was the keeper of Conifers at Kew until his retirement. It is very much a reference work rather than a "good read", and illustrations are a bit sparse.

Johnson, O & More, D (2004), *Collins Tree Guide*, Collins, London.
This is reasonably up to date and comprehensive for Britain but, to be honest, I prefer the older Mitchell guide listed below. The illustrations are rather poor, the authors don't believe in keys and the distinctions between species can be a bit disorganised and vague.

Mitchell, A F (1972), *Conifers in the British Isles*, HMSO, London.
This is a terrific book if you want to know what's what in Britain. There is a lot of detail on each species, some very good line illustrations (some of them filched for these notes). There are lists of specimen trees for almost everything – but remember that this book pre-dates 1986-1987, so some may not be there any more! Sadly out of print, but second-hand copies can be found, and the entire work is also available online for free at https://www.forestresearch.gov.uk/research/archive-conifers-in-the-british-isles-a-descriptive-handbook/.

Mitchell, A F (1974), *A Field Guide to the Trees of Britain and Northern Europe*, Collins, London.
Good keys (including one for weird cultivars), good consistent, concise descriptions, nice line illustrations and better plates than the later Johnson and More volume. Sadly, also out of print; but lots of second-hand bargains are available for both the softback and hardback editions.

Poland, J & Clement, E J (2009), *The Vegetative Key to the British Flora*, BSBI, London.
Some very interesting identification keys (I think there are a few weaknesses), and coverage of some species that I don't include here.

Stace, C A (2019), *New Flora of the British Isles,* 4th edition, C & M Floristics, Suffolk.
The keys are practical, if terse, but cover a limited number of species. Taxonomy is substantially revised since the third edition.

The Gymnosperm Database, https://www.conifers.org.
A worldwide resource with full species descriptions, photographs, distribution maps, ecological notes, literature references and other interesting material.

Trees and Shrubs Online, http://http://treesandshrubsonline.org.
A huge resource based on the last published edition of *Bean's Manual of Trees and Shrubs*, with extensive additions and enhancements. It can be searched by genus name.

Pinus sylvestris bud

WHERE TO SEE SPECIMEN CONIFERS IN HAMPSHIRE

Hillier Gardens, Ampfield (SU3723) has a bewildering variety including a lot of rarities, although some of the more ordinary things are absent or hard to track down. Some specimens are still quite small. It is a good place to get to know your genera and also to see the range in variation in some species such as Lawson Cypress.

Alice Holt (SU8043) is a Forestry Commission research station with a wide variety of experimental plantings and some specimen trees.

Rhinefield, including Blackwater Arboretum (SU2604) has many 19th-century specimen plantings.

Bolderwood (SU2507) includes a more limited range of spectacular trees.

Puckpits Inclosure (SU2509) has interesting 19th-century plantings, and the surrounding Highland Water Inclosure has large commercial stands and a few recently planted specimen trees.

Exbury (SU4200) has some fine individual trees.

Most large country estates with parkland in Hampshire have at least a few things of interest although the palette is usually more limited. Churchyards can turn up individual surprises, and the leafier and older-established suburbs can often reveal a surprising variety. Within 10 minutes' walk of my home in Chandlers Ford, I can see examples of *Araucaria, Cedrus* (all three species), *Cupressus, Ginkgo, Juniperus, Larix, Picea, Pinus, Pseudotsuga, Sequoia, Taxus* and *Thuja.*