

12. Plant identification

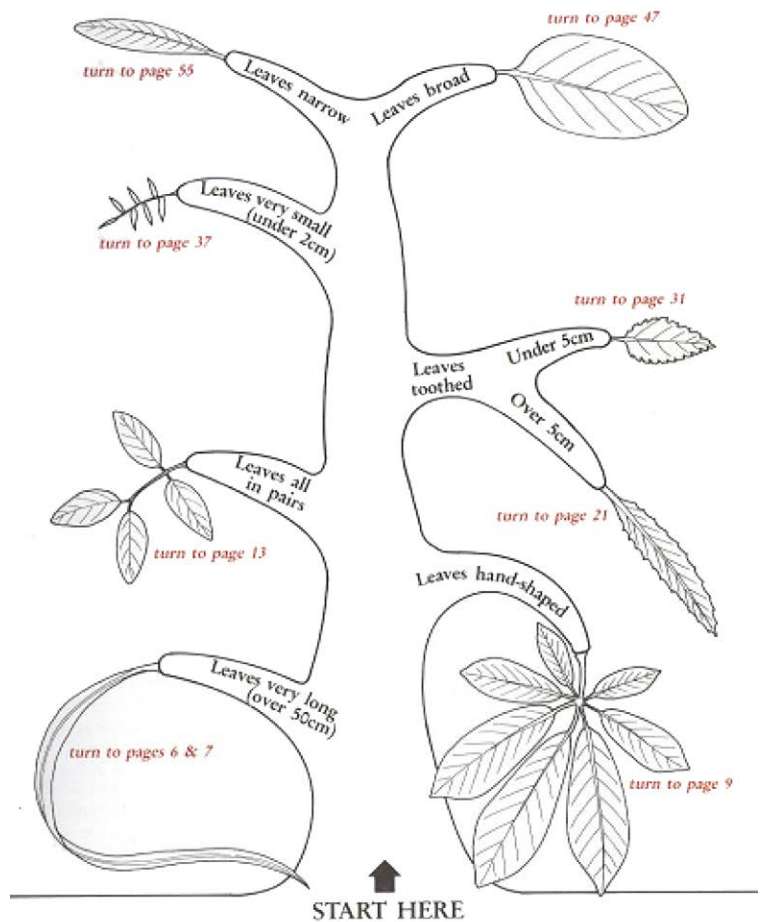
There are many sources of information to help identify plants:

1. **Written and pictorial descriptions** of plants, which you can compare with your unknown specimen to aid in its identification. Good descriptions direct you to crucial diagnostic features for the relevant taxon, explain the range variability found and point out botanical and ecological characteristics of importance. A good source of information about native plants is the website of the New Zealand Plant Conservation Network – see www.nzpcn.org.nz. This site has information (including photos) about all New Zealand’s indigenous and naturalised exotic plants.

Please note—to use an identification guide properly, you need to know enough of the vocabulary to understand the choices presented to you. All good identification guides provide a glossary and a list of abbreviations to help with this.

2. **Ask an expert.** Many people around the country, including professional botanists and members of botanical societies, may be able to assist with identification. Providing fresh samples will help accurate identification, but may not always be possible. Ensure that you have the appropriate permission before collecting specimens (see page 59). Alternatively, photographs that show significant features can be used. A desktop scanner is a useful way to make an image of the specimen if you don’t have a good camera.

3. **Keys** help you find the likely description of your specimen rapidly and simply. Most keys are arranged to present you with a series of choices (decision points), usually dichotomous (dividing in two). The paired statements of each ‘couplet’ are framed to be contrasting and mutually exclusive. Each choice you make narrows down the possibilities for your specimen until you find the appropriate description. Terminology is precise and brief. Keys can vary in complexity. An easy one to use is *Which Native Tree?* by Andrew Crowe.



Advice for using keys

- Note down the route taken—to trace path in case you need to back track
- Read full description of both choices for each step
- Do not guess—consult glossary if precise meaning of term unknown. Where measurements are required, use a ruler
- If features are very small, use an appropriate lens to inspect them clearly.
- If key is multi-part one, look carefully at the descriptions for higher levels of taxa before progressing to species key.
- If both pairs of choices seem reasonable, try each route—one will usually prove to be unsuitable at a later stage.

You may like to try out the following key on a kōwhai *Sophora* sp. specimen:



A selection of *Sophora*: Clockwise from above: *S. chathamica* (photo: Geoff Walls), *S. fulvida*, *S. molloyi*, *S. prostrata*.

Sophora (FABACEAE) in New Zealand: taxonomy, distribution, and biogeography

P. B. Heenan, P.J. de Lange and A.D. Wilton

Key to the New Zealand kōwhai species (adapted from *NZ Journal Of Botany* 2001, Volume 39)

This key is only for New Zealand species of *Sophora*, and does not include hybrid material. If the key does not work, the plant material should be checked to see if it is hybrid origin.

- 1 Shrub, branches at or near ground level and usually slender..... 2
Tree, branches well above ground level and usually thick..... 5
- 2 Branchlets not interlaced, usually grey to grey-brown, glabrous to sparsely hairy 3
Branchlets interlaced, usually yellow-brown to orange-brown, sparsely to moderately hairy 4
- 3 Shrub usually wider than high; main branches spreading to decumbent, sometimes prostrate, underground branches and rhizomes absent; leaves 23-37 leaflets; Leaflets 5.0-12.0 x 2.0-6.0 mm elliptic, elliptic oblong, to broadly elliptic, sparsely hairy; Kapiti island, islands in Cook Strait, southern headlands of North Island, dry and exposed windy bluffs..... ***S. molloyi***
Shrub usually of similar width and height; main branches upright to spreading, underground branches and rhizomes usually present, often with numerous branches near the base; leaves with 35-52 leaflets; leaflets 3.3-5.8 x 2.5 -3.1 mm, orbicular, obovate, to oblong obovate, usually more or less glabrous; northern Nelson, western Marlborough, marble and limestone outcrops ***S. longicarinata***
- 4 Branchlets interlaced on juvenile and adult; leaves <3 cm long, leaflet pairs 1-5, usually glabrous; standard petal orange; pods lacking wings; seeds dark brown; eastern South Island, dry grey scrub communities ***S. prostrata***
Branchlets interlaced in juvenile only; leaves > 3cm, leaflet pairs > sparsely to moderately hairy; Flowers usually absent, if present standard petal yellow; pods usually absent, if present winged; seeds yellow or yellow brown; North and South Islands, terraces and hillslopes ***S. microphylla***
5. Ovary and leaves with hairs spreading, curved and/or twisted; leaflets densely hairy 6
Ovary and leaves with hairs appressed, straight, leaflets not densely hairy, or if densely hairy greater than 15 mm long 7
- 6 Leaves with 61-91 leaflets; leaflets elliptic to elliptic oblong, occasionally narrowly obovate usually sessile; leaflet hairs appressed, decumbent, or spreading, predominantly straight and sometimes twisted; northern North Island, andesitic and volcanic rock outcrops ***S. fulvida***
Leaves with 47-75 leaflets; leaflets ovate, broadly elliptic, to sometimes more or less orbicular, with a more or less petiolule; leaflet hairs appressed, decumbent, spreading or patent, predominantly curly, curved, or twisted, central North Island, siltstone, sandstone and mudstone (papa) ***S. godleyi***
- 7 Leaves with less than 23 leaflets; leaflets more than 18 mm long, three times longer than wide narrowly elliptic to elliptic-oblong, densely hairy; eastern North Island, terraces and hillslopes ***S. tetraptera***
Leaves with more than 24 leaflets; leaflets less than 16 mm long, length usually less than twice their width, elliptic, broadly elliptic, obovate, broadly obovate, ovate, broadly ovate, oblong to more or less orbicular, glabrous or moderately hairy 8
- 8 Juvenile growth present, leaflets 4.5-12.5 x 2.3 -5.7 mm, distal and proximal leaflets usually similar in size, distant, not crowded or overlapping, elliptic, broadly elliptic, obovate to ovate, sometimes more or less orbicular, usually moderately hairy; North and South Islands, terraces and hill country ***S. microphylla***
Juvenile growth habit absent, leaflets 6.0-16.0 x 4.0-8.0 mm, distal leaflets usually smaller than proximal leaflets, crowded and overlapping, broadly elliptic, broadly obovate, obovate to more or less orbicular, moderately hairy; North Island and Chatham Islands, coastal and lowland hill country ***S. chathamica***
Juvenile growth absent; leaflets 3.3-5.8 x 2.5-3.1 mm, distal and proximal leaflets similar in size, overlapping to distant, orbicular, obovate, to oblong-obovate, more or less glabrous; Northern Nelson, western Marlborough, marble and Limestone rock outcrops ***S. longicarinata***



Key to the New Zealand gymnosperms (conifers) 21 species

3 = kauri/kawaka group—dry cone group

5 = celery pine group

9 = tōtara group—needle-leaved podocarp group

10 = matai/miro—plum-fruited podocarp group

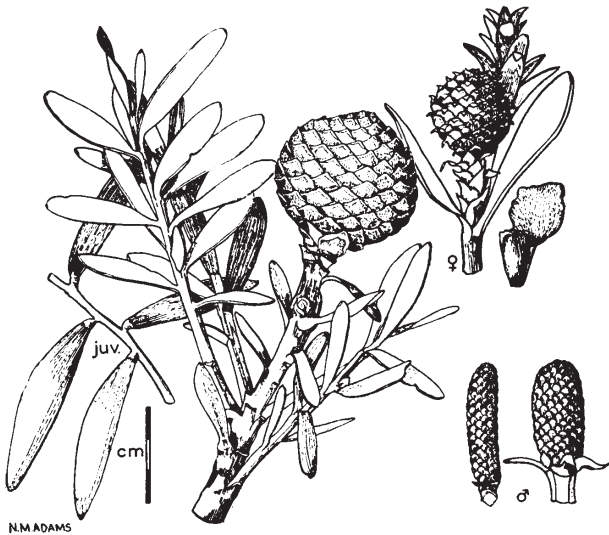
11/12 (and 2 (b)0 = rimu-like group for convenience—scale leaved podocarp group

1. (a) Trees or shrubs with part of the cone or seed fleshy. 2
 (b) Trees, with dry winged seeds, some reaching 35–(60) metres or more when mature. 3
2. (a) Trees or upright shrubs. 4
 (b) Prostrate or sprawling herb-like shrub to 30 cm. **Lepidothamnus laxifolius**
 pigmy pine (0.3 m)
 PODOCARPACEAE
3. (a) Large, paddle shaped leaves up to 4 cm long (juveniles larger) with parallel veins. Large spherical cones with numerous seeds. **Agathis australis**
 kauri (60 m)
 ARAUCARIACEAE
 (b) Small flattened scale like leaves in 4 rows in opposite pairs; juvenile foliage frond-like. Mature branchlets compressed. Small cones of 4–6 scales. **Libocedrus plumosa**
 kawaka, NZ cedar (25 m)
 CUPRESSACEAE
 (c) Small cones of 4–6 scales, mature branchlets compressed. Bark very thick, pyramidal growth form. **Libocedrus bidwillii**
 mountain cedar (20 m)
 CUPRESSACEAE
4. (a) Trees or shrubs with rhomboid leaf-like flattened stems (cladodes or phylloclades) resembling celery leaf (hence common name celery pine). No true leaves. 5
 (b) True leaves present. 6
5. (a) Leaves larger than for tanekaha, phylloclades pinnately arranged on rachis which is 10–30 cm long thick leathery, bluish green—often bronze coloured. Bark greyish & warty with short horizontal ridges running around it. Northern North Island only. **Phyllocladus toatoa**
 toatoa (20 m)
 PHYLLOCLADACEAE
 (ex PODOCARPACEAE)
 (b) Green phylloclades 1.2 – 2.5 cm long, 9–15 on rachis 2.5 – 7.5 cm long. Bark smooth & lightish grey. **Phyllocladus trichomanoides**
 tānekaha, celery pine (30 m)
 PHYLLOCLADACEAE
 (ex PODOCARPACEAE)
 (c) “**Phyllocladus aff. trichomanoides**”
 Surville cliffs tānekaha
 PHYLLOCLADACEAE
 (ex PODOCARPACEAE)
 (d) Small tree or shrub, phylloclades smaller than for tanekaha. **Phyllocladus alpinus**
 mountain toatoa (9 m)
 PHYLLOCLADACEAE
 (ex PODOCARPACEAE)
6. (a) Mature and juvenile leaves similar. 7
 (b) Mature leaves small and scale-like, juvenile leaves larger, gradual or abrupt transition from leafy juvenile shoots bearing linear leaves to narrow adult shoots with appressed scale leaves. 12
7. (a) All leaves usually linear, at least 10 mm long 8
 (b) Small scale or awl-like leaves and exposed seeds on a fleshy base. Tall trees reaching over 35 m tall. 11
8. (a) Conifers with linear leaves and exposed seeds on a fleshy base. Leaves stiff and hard, straight, bark thick and stringy (hybrids in this group known). 9

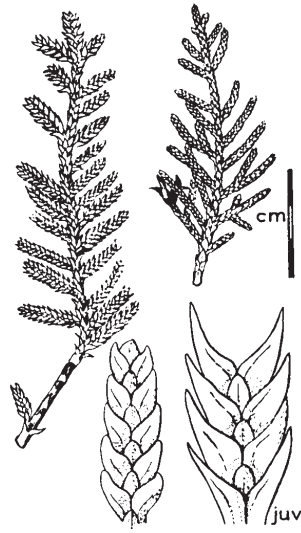


- (b) Conifers with linear leaves and seeds wrapped in a fleshy layer, stalk not fleshy. Leaves softer in texture, sometimes curved. 10
9. (a) Bark very thick and stringy. Large forest tree. Seed ovoid. ***Podocarpus totara***
tōtara (40m)
PODOCARPACEAE
- (b) Bark thinner more papery and flaky. Leaves often larger than true tōtara ***Podocarpus cunninghamii***
(formerly known as *P. hallii*), thin-barked tōtara, Hall's tōtara (20m)
PODOCARPACEAE
- (c) Bark thin and stringy, mature leaves greater than 10 mm long, needle-leaved shrub or small tree. ***Podocarpus acutifolius***
prickly tōtara (9m)
PODOCARPACEAE
- (d) Prostrate to low growing alpine shrub, branches wide-spreading, leaves up to 15mm long. ***Podocarpus nivalis***
snow tōtara (5m)
PODOCARPACEAE
10. (a) Seeds with black flesh (like little plum). Leaves bluish green above and whitish below. in two irregular rows on branchlets. Leaf tips are rounded with a small sharp point. Bark bluish, almost black, shiny, hammer marked; loose flakes leave red marks on trunk when shed. Juvenile has untidy interlacing slender branchlets with a mixture of scale like leaves and larger linear leaves, bronze-green. ***Prumnopitys taxifolia***
mataī, black pine (40m)
PODOCARPACEAE
- (b) Seeds with red flesh (like little plum). Spirally arranged leaves are distinctly flattened into 2 rows, narrowed to a point and green underneath. Juvenile and adolescent leaves 1–3 cm long. Bark dark grey to grey brown, rough also hammer marked but not leaving red marks as in matai. ***Prumnopitys ferruginea***
miro, brown pine (25m)
PODOCARPACEAE
11. (a) Trees with black spherical seed on fleshy orange stalks. Juvenile with leaves in two rows, and branches not weeping, adult leaves are 2–3 mm long, awl-like closely appressed to the branchlets. Branchlets are characteristically upturned at their tips. Bark grey and “hammer marked”. Buttress roots. ***Dacrycarpus dacrydioides***
kahikatea/ white pine (65m)
PODOCARPACEAE
- (b) Trees with black pear-shaped seeds projecting from red fleshy cups. Juvenile leaves not in distinct row, branches weeping, bark dark brown and coming off in large flakes. ***Dacrydium cupressinum***
rimu, red pine (60m)
PODOCARPACEAE
12. (a) Trees with ribbed seeds seated on orange fleshy cushions. Juvenile foliage large 15–40 mm long linear leaves. Abrupt transition to adult foliage consisting of 2–3 mm long, overlapping scale leaves, weakly keeled on back. Northern North island only. ***Halocarpus kirkii***
manoao, Kirk's rimu (25m)
PODOCARPACEAE
- (b) Shrub showing abrupt transition from leafy juvenile shoots bearing linear leaves to narrow adult shoots with appressed scale leaves Juvenile leaves 5–10 mm long, 1–1.5 mm wide; fleshy outgrowth at base of ribbed seed white-yellow. ***Halocarpus bidwillii***
bog pine (5m)
PODOCARPACEAE
- (c) Erect small tree, bark scaling off in small flakes, reddish silver beneath. Juvenile leaves 1–20 mm long; adult leaves with prominent keel on back. Fleshy outgrowth at base of ribbed seed orange (as for *H. kirkii*). ***Halocarpus biformis***
pink pine (9m)
PODOCARPACEAE
- (d) Rounded bush or small tree with seeds half hidden in surrounding greenish fleshy scales. Bark thin grey to reddish brown not flaking, unfissured. Juvenile foliage on erect or spreading shoots. Adult leaves strongly keeled, shoot tips erect, seed subtended and half hidden by green to whitish green fleshy scale. ***Manoao colensoi***
manoao, silver pine (15m)
PODOCARPACEAE
- (e) Small tree, bark thin, grey, Juvenile foliage on drooping shoots; leaves of semi-adult stage bristling all round the shoot; adult scale leaves weakly keeled; shoot tips curving over and down. 2–3 yellow fleshy scale leaves subtending seed. ***Lepidothamnus intermedius***
yellow-silver pine (15m)
PODOCARPACEAE

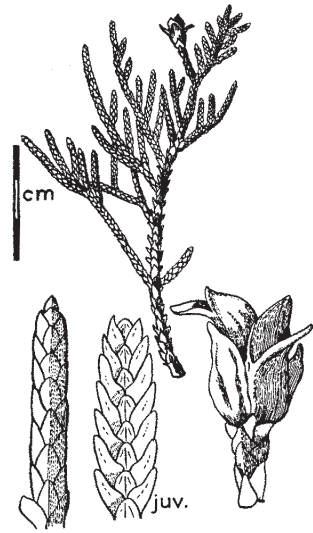




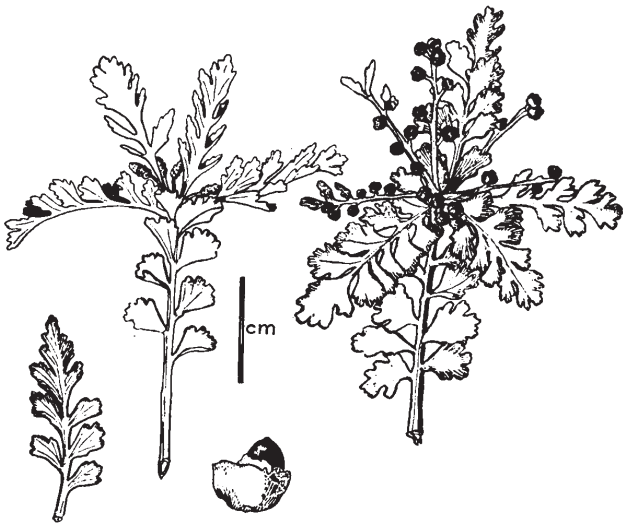
Kauri
(*Agathis australis*)



Kawaka
(*Libocedrus plumosa*)



Kaikawaka
(*Libocedrus bidwillii*)



Tānekaha
(*Phyllocladus trichomanoides*)



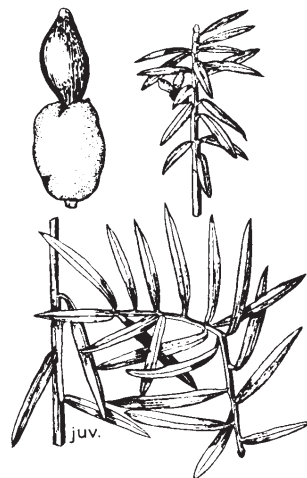
Toatoa
(*Phyllocladus toatoa*)



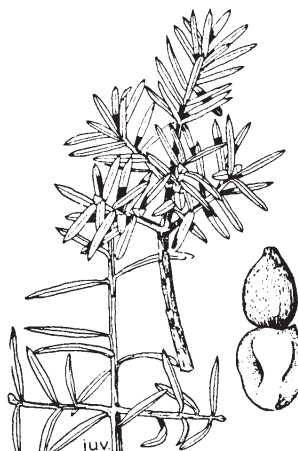
Alpine toatoa
(*Phyllocladus alpinus*)



Prickly tōtara
(*Podocarpus acutifolius*)



Thin-barked tōtara
(*Podocarpus cunninghamii*)



Tōtara
(*Podocarpus totara*)

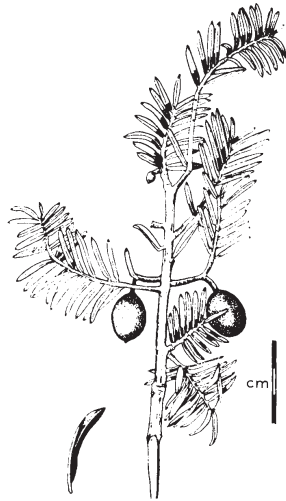


Snow tōtara
(*Podocarpus nivalis*)





Matai
(*Prumnopitys taxifolia*)



Miro
(*Prumnopitys ferruginea*)



Kahikatea
(*Dacrycarpus dacrydioides*)



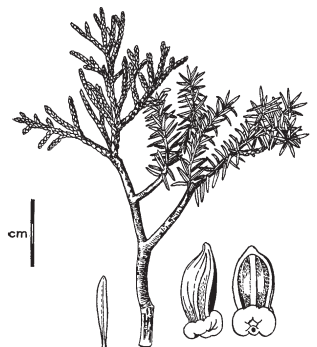
Rimu
(*Dacrydium cupressinum*)



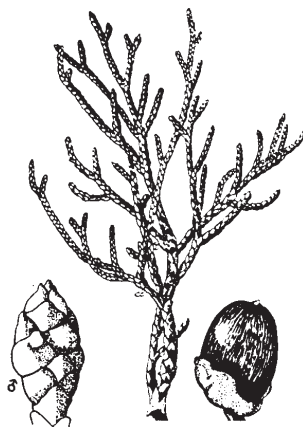
Manoao
(*Halocarpus kirkii*)



Bog pine
(*Halocarpus bidwillii*)



Pink pine
(*Halocarpus biformis*)



Manoao/silver pine
(*Manoao colensoi*)



Yellow silver pine
(*Lepidothamnus intermedius*)



Pigmy pine
(*Lepidothamnus laxifolius*)

Gymnosperm illustrations from *Trees and Shrubs of New Zealand* by AL Poole and Nancy M Adams, © Landcare Research New Zealand 1994.



Introduction to plant life in New Zealand