

Phyllocladus toatoa

COMMON NAME

toatoa

SYNONYMS

Phyllocladus glaucus Carriere [auct. non.]

FAMILY

Phyllocladaceae

AUTHORITY

Phyllocladus toatoa Molloy

FLORA CATEGORY

Vascular – Native

ENDEMIC TAXON

Yes

ENDEMIC GENUS

No

ENDEMIC FAMILY

No

STRUCTURAL CLASS

Trees & Shrubs - Gymnosperms

NVS CODE

PHYTOA

CHROMOSOME NUMBER

2n = 18

CURRENT CONSERVATION STATUS

2017 | Not Threatened

PREVIOUS CONSERVATION STATUSES

2012 | Not Threatened

2009 | Not Threatened

2004 | Not Threatened

DISTRIBUTION

Endemic. New Zealand: North Island from about Awakino (in the west) and Lake Waikaremoana (in the east) north to Ahipara and Mangonui. There is an outlier population in the northern Kaimanawa Range. Somewhat uncommon and often absent over large parts of this range.

HABITAT

Found from sea level to c. 1000 m a.s.l. Toatoa is generally associated with relatively infertile soils on exposed ridges, around bog margins, and on other poorly drained land.



Phyllocladus toatoa. Photographer: John Smith-Dodsworth, Licence: CC BY-NC.



Phyllocladus toatoa. Photographer: John Smith-Dodsworth, Licence: CC BY-NC.

DETAILED DESCRIPTION

Small trees up to 15–25 m tall. Young or exposed plants conical in outline, shaded or enclosed plants with bushy, somewhat rounded, heavy crowns. **Stems** one or more, erect or leaning, strongly tapered, up to 900 mm diameter, with regular coppice and epicormic shoots. **Branches** distinctly whorled, robust, suberect, horizontal, or downturned with upturned ends, leaving prominent rounded to elliptic branch scars when shed, and characteristic raised ridges encircling the stems. **Outer bark** brown, grey-brown, or silvery-brown, at first smooth or lenticellate, persistent, later vertically fissured with prominent rounded or irregular lenticels, occasionally shedding in squarish or rectangular flakes; inner bark dark orange. **Roots** of mature trees plate-like, pegged, often with low rounded buttresses; mycorrhizal nodules or stub roots simple or branched, epidermal hairs abundant. Strong, erect, epicormic shoots from fallen layered stems. **Cotyledons** 2, 12–20 × 2–3 mm, submembranous, linear, acute, green above, glaucous beneath, stomata on lower surface only, veins 2, spreading horizontally or drooping, often strongly curved and horseshoelike, persistent. **Juvenile leaves** of seedlings and epicormic shoots 10–20 or more, 10–15 × 1–2 mm, submembranous, linear and needle-like, acute or obtuse, sometimes falcate, green above, glaucous beneath, stomata on lower surface only, single veined; spreading horizontally or curved downwards, persistent. **Seedling phylloclades** (flattened branch complex) 15–50 mm long, deeply pinnately lobed, determinate, subtended by juvenile leaves; transition to adult phylloclades gradual or rapid. **Adult phylloclades** 5–300 mm long, distinctly whorled, simple, or compound and pinnately lobed, determinate or indeterminate, subtended by scale leaves, each phylloclade consisting of 5–14 alternate, distichous, dorsiventral segments 20–80 × 20–40 mm, the segments very leathery, rhombic to flabellate with shallowly or deeply lobed or toothed, thickened, revolute margins, yellow-green, cup-shaped and amphistomatic when young, later flattened, green above, somewhat glaucous beneath, with stomata on lower surface only, sessile or stalked. **Resting buds** 5–20 × 3–10 mm, characteristically coated with a white resinous film, consisting of few to many scale leaves, the outermost 0.5–15.0 mm long, subulate, erect, loosely imbricate, at first green with stomata on the lower surface, later reddish, the innermost 10–15 mm long on expansion, linear-obtuse to spatulate, at first green with stomata on the lower surface only, later reddish brown, deflexed and deciduous. Plants unisexual, with inconstant males and females. **Male cones** 5–20 in terminal whorled clusters, 15–30 × 5–10 mm at the widest point, cylindrical to wedge-shaped, each on a stout bracteate stalk 5–15 mm long; sporophylls many, each with 2 sporangia; pollen monad with 2 small sacci. **Female cones** distichous on basal regions of phylloclades, or more rarely on phylloclade segments; 0.5–0.8 × 0.5 mm, ovoid to globose, each on a short stout bracteate stalk and consisting of few to many spirally arranged cone bracts; fertile bracts supporting a single, erect, sessile, flask-shaped ovule, arillate at base. **Seeds** 3–4 × 2.5–3 mm, ovoid to squarish, dorsiventrally compressed, nutlike, dark brown to almost black, protruding when mature, and surrounded at the base by a white, thinly fleshy, crenulate or erose aril; micropyle distinct, curved to the ventral side.

SIMILAR TAXA

Toatoa is easily distinguished from all other species of *Phyllocladus* by its strictly whorled pinnate phylloclades with diamond- to fanshaped segments, its terminal clusters of 5–20 cylindrical to wedge-shaped male cones, and its short-stalked, ovoid to globose female cones supporting 3–15 seeds.

FLOWERING

October–December

FLOWER COLOURS

No flowers

FRUITING

January–March

PROPAGATION TECHNIQUE

Difficult. Although sometimes toatoa is easily grown, even well established plants are prone to suddenly and inexplicably dying. Seems to do best in a free draining, moist soil with the root system kept in partial shade but the tree allowed to grow out into full sun.

THREATS

Not Threatened. Toatoa has a patchy distribution and is often absent over large parts of its potential range. However, where it is present it is often locally common, typically forming dense stands of seemingly even-aged trees.

ETYMOLOGY

phyllocladus: Leaf branch, referring to the leaf-like stems

toatoa: From the Maori name

ATTRIBUTION

Fact sheet prepared for NZPCN by P.J. de Lange 1 August 2004. Description adapted from Molloy (1996).

REFERENCES AND FURTHER READING

Molloy BPJ. 1996. A new species name in *Phyllocladus* (Phyllocladaceae) from New Zealand. *New Zealand Journal of Botany* 34(3): 287–297. <https://doi.org/10.1080/0028825X.1996.10410695>.

Moorfield JC. 2005. Te aka : Māori-English, English-Māori dictionary and index. Pearson Longman, Auckland, N.Z. 357 p.

NZPCN FACT SHEET CITATION

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MORE INFORMATION

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