

## A Comparative Review on 50 Herbal Plants found in New Zealand and Taiwan

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### Review Article

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#### ABSTRACT

**Background:** Austronesian-speaking peoples in Taiwan and New Zealand share similarities in terms of culture and traditional knowledge but the climate and natural resources are considerably different. This study intends to scientifically compare 50 similar plants found in New Zealand and Taiwan.

**Material and methods:** This literature review is conducted by thorough database searches, field visits to New Zealand and Taiwan, and discussions with indigenous people who are knowledgeable with herbal plants.

**Discussion:** After a thorough comparison of the herbal plants found in New Zealand and Taiwan, the same or similar plants have different traditional usages, with possible reasons: descriptions of their medicinal purpose is vague and broad, often being passed down by word of mouth with no evidence base. This leads to room for subjective conclusion. Through scientific articles and field visits, evidence based biological activities of the compared herbal plants are provided.

**Conclusion:** Even though there are similarities between the herbal plants in Maori and Taiwan, they have different usages.

### INTRODUCTION

Indigenous cultures in New Zealand and Taiwan share a common Austronesian origin. Maori are the indigenous people of New Zealand, and said to have travelled from a faraway place named Hawaiki, which is likely to be Taiwan <sup>[1]</sup>. Anthropological studies indicate that Taiwan is the origin of the Austronesian languages which then distributed across the Philippines, Vietnam, and the Pacific islands, including New Zealand. Furthermore, New Zealand and Taiwanese anthropologists support the theory that Maori originated from Taiwan. It highlights the importance of comparative studies and exploring applications of such knowledge as a means to revive cultural heritage and traditional wisdom <sup>[2-4]</sup>.

The term "ethnobotany" was coined in 1896 by American botanist John W. Harshberger, which describes the knowledge of medicinal plants used by indigenous people over long periods of time. Ethnobotany is a shortcut to develop new medicines as indigenous medicinal experiences offer insight into the choices of plants with developmental potential <sup>[5]</sup>. For example, curine extracted from *Chondrodendron tomentosum* and has a toxic effect on the nerves was once used by native Americans in their poison arrows. It is now used as a muscle relaxant. Anti-malarial drug Artemisinin has recently been separated from Chinese medicine *Artemisia annua* and the discovery resulted in the 2015 Nobel Prize for Physiology/Medicine. Both Taiwan and New Zealand have diverse vegetation and abundance of species <sup>[6,7]</sup>. The two groups of indigenous people have the same origin and established histories. Research on the ways two indigenous peoples use similar local medicinal plants not only contributes to science, practical applications, but further strengthens ties between two cultures.

### MATERIALS AND METHODS

Data was mainly gathered from intensive literature search, and the first author's field visits to collect publications in New Zealand and Taiwan. First, 50 plants were selected for comparison by conducting a thorough review of plants with medicinal value listed in official publications and identifying the closest pairs. The names of these plants were then used as keywords in database

search engines such as PubMed, ScienceDirect and Google Scholar. Snowballing from reference also generated useful literature [8]. In addition, author Huang-Lin Huang collected paper-based documents from individuals and organizations in New Zealand and Taiwan. Data recruited in the research included materials from government and non-government websites, journal articles and dissertations on history and use of traditional medicine, as well as archaeological records of medicinal plants. Information in terms of scientific name, vernacular name, family and genus name, distribution, morphology, content, traditional use, biological activity and other aspects of the 50 plants were collated and presented in (Tables 1-50). Comparison of 50 Maori and Taiwan plants: A. Cultivated greens (including herbs, weeds, and roots) (Tables 1-25 and Figures 1-25). B. Shrubs and/or trees (Tables 26-44 and Figures 26-44). C. Ferns (Tables 45-48 and Figures 45-48) and D. Fungi (Tables 49 and 50 and Figures 49 and 50).

Table 1. Distribution of *Althaea officinalis* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Althaea officinalis</i> L.	<i>Althaea rosea</i> (L.) Cav.
<b>Vernacular name</b>	Meme, Marsh-mallow	Hollyhock
<b>Family</b>	Malvaceae	
<b>Genus</b>	<i>Althaea</i>	
<b>Distribution</b>	Afghanistan, Canada, Kazakhstan, Kyrgyzstan, Pakistan, Russian, Tajikistan, Turkmenistan, United States, Uzbekistan and New Zealand.	Syria, China; cultivated in Taiwan.
<b>Morphology</b>	Herbs perennial. Stems erect, clustered, softly stellate-tomentose. Leaves: stipules, usually caducous, linear-lanceolate, densely stellate-hairy. Inflorescences solitary flowers or 2-4-flowered fascicles in leaf axil. Flowers: lobes narrowly ovate-acuminate, stellate-velutinous; petals usually pale pink, cuneate-obovate; fruits partially concealed by incurved, somewhat accrescent calyx lobes. Seeds brown, reniform-round [9].	
<b>Content</b>	The plant contains chlorophyll, carotenoid, uronic acids, rhamnase, rhamnogalacturonan, mucilage, phenolic acids, tannins, flavone glycosides, and pectin [10-13].	The roots contain mucilage, pentosans, methyl pentosans and uronic acid. The leaves contain dioxybenzoic acid and athaeno. The flowers contain herbacin, berbacetin.
<b>Traditional use</b>	The plant is used to treat digestive and respiratory system disorders [12].	The roots can be used to clear heat and cool blood, promote urination and expel pus. The sprouts can be used to treat heat toxin induced dysentery. The flowers can promote urination and excretion. The seeds can drain dampness, relieve strangury and lubricate the intestines. It can be made into a medicinal lubricant to treat mucosal inflammations.
<b>Biological activity</b>	The plants have antioxidant capacity [12]. The extracts from the roots, is reported to stimulate epithelialisation of injured tissue and anti-inflammatory properties [16,17].	The plants have anti-diabetes [13] and antioxidant [14]. The flowers are employed medicinally for their emollient, demulcent and diuretic properties [15].



Figure 1. Biennial erect herbs, 1.5-3 m high, stellate. Leaves alternate, base cordate, irregularly toothed or crenate, surfaces rough and wrinkled. Flowers solitary, axillary; calyx round, cup shaped, corolla purplish red, pale red or white; petals 5 [18].

Table 2. Distribution of *Amaranthus powellii* S. Wats.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Amaranthus powellii</i> S. Wats.	<i>Amaranthus spinosus</i> L.
<b>Vernacular name</b>	Va'ine'Ara, Redroot	Thorny amaranth
<b>Family</b>	Amaranthaceae	
<b>Genus</b>	<i>Amaranthus</i>	
<b>Distribution</b>	Bolivia, Ecuador, Hungary, Mexico, United States and New Zealand.	Distributed in India, China, Philippines, Taiwan, and the other tropical regions of the world.
<b>Morphology</b>	Erect, ± hairy annual herb to c. 80 cm high, but plants often only a few cm high in impoverished conditions. Stem angular, ± hairy when young, red, especially towards base. Flowers: tepals very unequal, oblong, keeled, gradually tapering to the sharply acute or short-acuminate apex. Fr. subglobose, circumscissile, usually with prominent neck, not exceeding tepals except for the 3 persistent stigmas. Seeds lenticular, dark brown or black [18].	
<b>Content</b>	The plant contains betalains [19].	The stem and leaf contain saponins.

<b>Traditional use</b>	Edible weeds <sup>[20]</sup> .	The whole plant can treat venomous snake bites. When applied externally, it can be used to cover inflammations and traumatic injuries. The leaf decoction can promote urination, and provide good curative effects for strangury diseases and profuse menstruation. The mashed leaves can be used to cover eczema; the paste form can accelerate the expelling of pus from perianal sores and abscesses. The root can treat hernia pain and eczema, and it has lactation promoting effects. It has curative effects for cholera and can unblock the meridian. The leaf can resolve phlegm, bronchitis and hardness of breathing. The seed can be used to cover bone fracture.
<b>Biological activity</b>	The plants have antioxidant capacity <sup>[19]</sup> .	The seed has hepatoprotective potential. The leaves has antioxidant and antipyretic properties <sup>[21,22]</sup> .



**Figure 2.** Monoecious annual herb; stems erect, branched, glabrous. Leaves simple, alternate, green flushed with red, ovate to oblong ovate. Inflorescence a terminal, dense, paniculate spike; Flowers unisexual, 3 tepals. Utricles globose, wrinkled on surfaces. <sup>[8]</sup>.

**Table 3.** Distribution of *Apium prostratum* Vent.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Apium prostratum</i> Vent.	<i>Apium graveolens</i> L.
<b>Vernacular name</b>	<i>Tutae</i> , sea celery	Celery
<b>Family</b>	<i>Apiaceae</i>	
<b>Genus</b>	<i>Apium</i>	
<b>Distribution</b>	Chile, South Africa and New Zealand.	Cultivated in mainland China and Taiwan.
<b>Morphology</b>	Procumbent to ascending, terrestrial perennial, not rooting at nodes. Leaves pinnately 3-foliolate to 1–2-pinnate; ultimate segments broadly or narrowly ovate to deltate, usually lobed and crenate, c. 5–30 mm long; Umbels compound, usually sessile or subsessile, Flower numerous, white. Fruit broadly ovoid <sup>[18]</sup> .	
<b>Content</b>	The plant contains furanocoumarins <sup>[23]</sup> .	The stems and leaves contain bergapten, carotene, α-selinene. The seeds contain graveobioside A, B <sup>[8]</sup> .
<b>Traditional use</b>	James Cook's Eighteenth-Century Prevention of Scurvy by the Use of <i>A. prostratum</i> as Dietary Supplements <sup>[24,25]</sup> .	The whole plant contains pressure reducing substances and can soothe the liver, clear heat, expel cold and drain dampness. It can be used to treat hypertension, headache and dizziness, rosacea, conjunctivitis and carbuncles.
<b>Biological activity</b>	The plants have antifungal capacity <sup>[26]</sup> .	The oil from the seeds has a calming effect on CNS and convulsion inhibiting effects. The seed extract has contracting effects on the uterus. The decoction of fresh leaves can accelerate the fermentation by yeasts.



**Figure 3.** Annual or perennial herbs, glabrous, strongly fragrant, 0.7~1 m tall. Stems terete, upper branches with ribs and nodes. Radical leaves clustered, odd pinnate, obovate to oblong, long petiolate; leaflets 2 or 3 pairs, 3-parted, segments triangular-orbicular or pentagonal-orbicular. Inflorescences axillary or terminal compound umbels. Flowers bisexual, small, 5 petals, white, broadly ovate, incurved.

**Table 4.** Distribution of *Artemisia abrotanum* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Artemisia abrotanum</i> L.	<i>Artemisia capillaris</i> Thunb.
<b>Vernacular name</b>	Wormwood, Southernwood	Wormwood, Mugwort
<b>Family</b>	Asteraceae	
<b>Genus</b>	<i>Artemisia</i>	
<b>Distribution</b>	Canada, United States and New Zealand.	China (eastern, south central, northeast) and Taiwan.
<b>Morphology</b>	Perennials or subshrubs, aromatic (roots thick, woody). Stems relatively numerous, erect, brown, branched, (woody, brittle), glabrous or sparsely hairy. Leaves cauline, dark green; blades broadly ovate, faces sparsely hairy (abaxial) or glabrous (adaxial). Involucres ovoid, Phyllaries oblong-elliptic, sparsely hairy.	
<b>Content</b>	1,8-cineole, linalool and davanone, while the flavonol fraction contains centaureidin, casticin, quercetin dimethyl-ethers, terpenes, flavonols, coumarins and cinnamic acid derivatives [27].	Above-ground parts contain limonene, terpinene, β-gurjunene, α-bergamotene and β-elemene. The inflorescence contains isoscopoletin and artemillin A and C. The flower buds contain isorhamnetin, quercetin, casticin and hyperin. The sprouts contain caffeic acid.
<b>Traditional use</b>	The flowering stems are used in traditional medicine as a tonic, stomachic, diuretic, anthelmintic and antiseptic [28, 29].	The whole plant clears heat, drains dampness and clears jaundice. It can be used to treat itchiness and irregular, scanty and dark urination.
<b>Biological activity</b>	The essential oils and flavonols have been proven to contain antiseptic, antimicrobial, anti-inflammatory, spasmolytic properties and can also treat upper airway diseases [27].	<i>Artemisia capillaris</i> is an anticoagulant, clears heat, suppresses pain, dissipates inflammation, inhibits pathogenic microorganisms and has anticancer and diuretic effects.



**Figure 4.** Herbs, perennial, shrub-like. Root branched, slanted or straight, conical. Stems often tufted, ascending, robust at base. Radical leaves clustered, finely divided, both surfaces woolly. Outer pistillate florets 4~12.

**Table 5.** Distribution of *Brassica oleracea* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Brassica oleracea</i> L.	
<b>Vernacular name</b>	Haria, Cabbage	
<b>Family</b>	Brassicaceae	
<b>Genus</b>	<i>Brassica</i>	
<b>Distribution</b>	Cultivated worldwide, as a vegetable in Taiwan and New Zealand.	
<b>Morphology</b>	Biennial to perennial herb usually with lax rosette. Stems erect or ascending, glabrous, 1–2–(3) m tall. Leaves all glabrous and glaucous. Lower Leaves petiolate, obovate or elliptic, toothed. Upper Leaves less divided, sessile, amplexicaul, elliptic-oblong or narrowly triangular, entire or toothed. Racemes to 60 cm long; open flowers well below level of buds. Petals pale yellow or white. Siliqua terete, glabrous, linear-lanceolate, slightly constricted between seeds; Seeds dark brown with greyish bloom [18].	
<b>Content</b>	The tender stems and leaves contain proteins, fat, sugars, crude fiber, Ca, Fe, carotene, riboflavin, nicotinic acid and vitamin C.	
<b>Traditional use</b>	The plant is used to treat hernia [24].	The leaves can drain dampness and clear heat, disperse nodules and ease pain, strengthen kidneys and reinforce deficiency. It has curative effects for jaundice, alimentary tract ulcers, rough joints and wasted.
<b>Biological activity</b>	The plants have antioxidant activity [30].	



**Figure 5.** Biennial herbs. Stems formed in first year fleshy, unbranched, radical leaves many, chartaceous, soft; blade oblong-ovate or suborbicular; outer blades pale bluish green, farinose, fleshy; inner blades milky white. Stems formed in second year branched, with cauline leaves, radical leaves bluish green, farinose, thick; blades widely elliptic or oblong, entire or shallowly serrate, cauline leaves conspicuously serrate, amplexicaul, uppermost leaves linear. Inflorescence racemes, terminal or axillary. Flowers large, 4 petals, milky yellow.

**Table 6.** Distribution of *Brassica rapa* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Brassica rapa</i> L.	
<b>Vernacular name</b>	Paea, Brassica campestris	
<b>Family</b>	Brassicaceae	
<b>Genus</b>	Brassica	
<b>Distribution</b>	Distributed along the Yangtze River, in northwestern China, New Zealand and Taiwan.	
<b>Morphology</b>	Annual with lax rosette. Stems erect or ascending, glabrous, to 1.5 m tall, Lower leaves petiolate, lyrate-pinnatifid with large terminal and 1–3 pairs of lateral lobes, bright green, bristly; margins sinuate, toothed. Upper leaves becoming amplexicaul, glaucous, not lobed, sessile, narrowly triangular. Petals bright yellow. Lateral stamens spreading; Seeds reddish brown <sup>[18]</sup> .	
<b>Content</b>	The plant contains glucoinapin, glucobrassi, canapin, glucoiberin, glucoraphanin, glucoalyssin, gluconasturtiin and glucorapiferen.	
<b>Traditional use</b>	The plant used to inhibition of postpartum haemorrhage <sup>[24]</sup> .	The whole plant can cool and dissipate blood, resolve toxins and relieve swelling. It can be used to treat bloody dysentery, erysipelas, carbuncles due to heat toxins, acute mastitis, rubella and hematemesis. It can also relieve intraocular pressure.
<b>Biological activity</b>	The plants have antioxidant activity <sup>[31]</sup> . The seeds and roots have hepatoprotective effect, anti-arthritic and anti-inflammatory property <sup>[32, 33]</sup> .	



**Figure 6.** Biennial herbs, 30~90 cm tall, glabrous, slightly farinose. Stems erect, stout, simple or branched. Terminal lobes orbicular or ovate; lateral lobes in 5 pairs, ovate; inflorescence a terminal raceme, somewhat corymbose. 4 petals, bright yellow, obovate or orbicular, clawed; seeds globose, reddish brown or black.

**Table 7.** Distribution of *Chenopodium album* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Chenopodium album</i> L.	
<b>Vernacular name</b>	Huainanga, Pigweed	
<b>Family</b>	Amaranthaceae	
<b>Genus</b>	Chenopodium	
<b>Distribution</b>	Distributed in India, China, Korea, Japan, Ryukyus, Taiwan, New Zealand and other warm regions of the world.	
<b>Morphology</b>	Erect or spreading, simple or branched, green or grey-farinose, sometimes reddish tinged, eglandular, non-aromatic, annual herb. Inflorescence paniculate, sometimes very narrow, terminal and axillary, glomerules approximately 8-flowered, dense or interrupted. Flowers usually in dense panicles, sessile or subsessile. Keel obtuse, green; margins broadly hyaline. Fruit completely invested by perianth; seeds horizontal, flattened, circular, glossy black, generally smooth except for faint striations; keel obtuse <sup>[18]</sup> .	

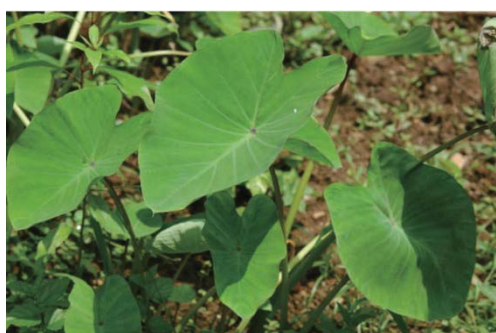
<b>Content</b>	The plant contains gallic acid, protocatechuric acid, protocatechuric aldehyde, vanillic acid, caffeic acid, syringic acid, vanillin and protocatechuric acids <sup>[34]</sup> .	
<b>Traditional use</b>	C. album is traditionally used as anthelmintic, cardiotonic, carminative, digestive, diuretic and laxative. It is also useful in peptic ulcer, dyspepsia, flatulence, strangury, pharyngopathy, splenopathy, ophthalmopathy and general debility <sup>[34,35]</sup> .	Fresh leaves are used as insecticides, the leaf juice is rubbed onto insect bites with a piece of cloth or the leaf decoction is used to wash insect wounds. Decoction made with the dry leaves and stems is used to treat strokes or as a toothache rinsing solution. The root is a purgative medicine. The fruit can disperse swelling.
<b>Biological activity</b>	Antiviral, antifungal, anti-inflammatory, antiallergic, antiseptic, antipruritic, antinociceptic, sperm immobilizing immunomodulating, antiparasitic, antispasmodic, antibacterial and antifungal and helpful in peptic ulcer and cardiac diseases. An <i>in vivo</i> study done has shown that the extracts prevent urolithiasis due to its ability to inhibit crystal growth and dissolution. Studies have shown that <i>Chenopodium album</i> extracts also have anti-bacterial properties, with the strongest activity against <i>B. subtilis</i> and <i>P. aeruginosa</i> <sup>[36,37]</sup> .	
<b>Others</b>	The plant possesses potent spasmolytic activity. <i>C. album</i> can be a good candidate for the development of a therapeutic drug for the treatment of muscle spasm and pain <sup>[34]</sup> .	



**Figure 7.** Annual herb, about 150 cm high; stems woody, much-branched, farinose, with purplish red striations. Leaves alternate, variable in size, soft, with a special odor, triangular-ovate, rhombic ovate to linear triangular. Inflorescence of short spike or of dense clusters of flowers arranged in spicate panicles, terminal or axillary. Apetalous; calyx yellowish green, fruit small, globose.

**Table 8.** Distribution of *Colocasia esculenta* (L.) Schott.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Colocasia esculenta</i> (L.) Schott	
<b>Vernacular name</b>	Taro, Taro	
<b>Family</b>	Araceae	
<b>Genus</b>	<i>Colocasia</i>	
<b>Distribution</b>	China (warm temperate to tropical areas), New Zealand and Taiwan.	
<b>Morphology</b>	Robust, tuberous, acaulescent perennials, with a cluster of long-petioled leaves. Leaves large; laminae peltate, ovate-cordate, veins somewhat reddish; basal female zone separated from upper male zone by shorter sterile zone made narrower by constriction of spathe; terminal sterile appendage variable in length with much-narrowed, acute tip. Berries green <sup>[38]</sup> .	
<b>Content</b>	The roots and stems contain proteins, starch, ash, lipids, calcium, phosphorus and iron. They also contain polysaccharides, mainly glucose and small quantities of galactose, rhamnose, arabinose and mannose.	
<b>Traditional use</b>	Ceremonial uses <sup>[39]</sup> .	It is used to treat spleen/stomach deficiencies and weaknesses, lack of fluid and strength, wasting thirst, abdominal mass, pyogenic infections, warts, corns, scabies and scalds. The leaves can be rubbed onto the skin to treat spider stings.
<b>Biological activity</b>	Antioxidant and anti-inflammatory <sup>[40]</sup> .	



**Figure 8.** Herbs, perennial. Rhizome ovoid, with numerous small bulbs, brown, ciliate. Leaves basal, 2 or 3 or more, broadly elliptic, thick, peltate, apex acute, base cordate, entire, undulate; petiole fleshy, green, sheathing below. Peduncle usually solitary, shorter than petiole.

Table 9. Distribution of *Cucurbita pepo* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Cucurbita pepo</i> L.	<i>Cucurbita moschata</i> Duchesne
<b>Vernacular name</b>	Kamokamo,	Cushaw and winter crookneck squashes
<b>Family</b>	Cucurbitaceae	
<b>Genus</b>	<i>Cucurbita</i>	
<b>Distribution</b>	Bolivia, Canada, China, Colombia, Costa Rica, Ecuador, Gabon, Honduras, Mexico, Nicaragua, Panama, United States, Venezuela and New Zealand.	Widely cultivated in Mainland China and Taiwan.
<b>Morphology</b>	Annual herb; stems long-running or trailing, scabrid, bearing branched tendrils, finely puberulent with more scattered long hairs. Margin denticulate; base broad-cuneate, situated in a deep obtuse sinus. ♂ flowers: corolla with prominent veins, hairy on both sides; ♀ flowers: peduncle short, stout, becoming hard, corky, angular and sometimes expanded at apex at fruiting; corolla similar to ♂ but often larger. Fr. extremely variable, developing a fairly to very hard rind, smooth or knobby, commonly cylindrical to oblong and green or greenish white, occasionally globose or subglobose and orange, white, or greenish; pulp white or pale green; margin sometimes scalloped. Seed whitish, ellipsoid; margin raised, obtuse.	
<b>Content</b>	This fruit contains high levels of gluconse, fructose and starch. As well as rich in potassium, zinc and dietary fibre. The plant contains vitamin E, 7-tocopherol, carotenoid and isoprenoid. The seeds contains various minerals such as iodine, oleic acid, linoleic, palmitic acid, magnesium, potassium, and calcium.	The fruit contains citrulline, arginine, asparagine, trigonelline, adenine, vitamin B and C, glucose, sucrose, pentasan, mannitol, α- or β-carotene, β-carotene-5,6-epoxide, β-cryptoxanthin, cucurbitacin B and taraxanthin.
<b>Traditional use</b>	The young fruits were boiled and used as baby food. It was also used to manage obesity <sup>[41,42]</sup> .	The fruit tonifies internally, boosts qi, dissipates inflammation, eases pain, promotes urination, resolves toxins and reduces swelling. It is used to treat pulmonary abscesses, wheezing syndrome, carbuncles, scalds, bee stings and enlarged prostate.
<b>Biological activity</b>	Mainly known for its improvement in prostatic hiperplasia (BPH), urinary dysfunction and cytotoxic properties, also has also been used extensively as a hypoglycaemic agent. Many pharmacological studies have demonstrated hepatoprotection, inhibit benign prostatic hiperplasia, antioxidant, anticancer, antimicrobial, antiinflammatory, antidiabetic, and antiulcer activities. It also has antiobesity activities, although the effects are dose dependent. <sup>[42]</sup>	The plants have anti-diabetic, antioxidant, hypotensive, anti-carcinogenic, anti-microbial, anti-parasitic, anti-inflammatory and hepato-protective.



Figure 9. Herbs, annual, monoecious, climbing. Stems 2~5 m long, white hispid, usually rooting adventitiously. Leaves simple, alternate, broadly ovate, palmatilobed, upper surface green, lower surface pale green, both surfaces hispid and tomentose; staminate inflorescences solitary; corolla yellow, campanulate, 5-cleft, margins of lobes recurved. Pistillate flowers solitary. Seeds numerous, compressed ovoid, broadly ovoid or ellipsoid, grayish white.

Table 10. Distribution of *Dioscorea alata* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Dioscorea alata</i> L.	
<b>Vernacular name</b>	Uwhi, Greater yam	
<b>Family</b>	Dioscoreaceae	
<b>Genus</b>	<i>Dioscorea</i>	
<b>Distribution</b>	China (Chechiang, Chianghsi, Fuchien, Hunan, Hupei, Kuangtung, Kuanghsi, Ssuchuan, Yunnan, Hsitsang), New Zealand and Taiwan.	
<b>Morphology</b>	Herbs, perennial, dioecious, twining. Tubers cylindrical. Stems dextrorsely twining, glabrous, 4-winged, sometimes spiny. Leaves basally alternate, upwardly opposite, green or purplish red, chartaceous, ovate, both surfaces glabrous. Staminate flowers: stamens 6. Pistillate flowers: staminodes 6; Seeds with membranaceous wings.	
<b>Content</b>	The tuber contains anthocyanin, cyanidin-3-O-glucoside, cyanidin- 3,5-O-diglucoside, cyanidin-3-O-gentiobioside, alatanin A, B and C, procyanidin B1 and B3.	

<b>Traditional use</b>	The plant used to diet <sup>[43]</sup> .	The tubers have curative effects for spleen deficiency-induced diarrhea, seminal emissions due to kidney deficiencies, leucorrhoea, frequent urination, coughing due to deficiency and overexertion, wasting thirst, ulcers, scalds and diabetes.
<b>Biological activity</b>	The plants have antiosteoporotic and antidiabetic activity. The extract has anti-inflammatory properties and activates TLR4-signaling pathways and inducing cytokine expression in macrophages for immune responses. It carries out the effect of up-regulating the expressions of IFN- $\gamma$ and IL-2 expression and down-regulating the IL-4 and IL-10 expression. <sup>[44-47]</sup> .	



**Figure 10.** Herbs, perennial, dioecious, twining. Tubers cylindrical. Stems dextrorsely twining, glabrous, 4-winged, sometimes spiny. Leaves basally alternate, upwardly opposite, green or purplish red, chartaceous, ovate, both surfaces glabrous. Staminate flowers: stamens 6. Pistillate flowers: staminodes 6; Seeds with membranaceous wings.

**Table 11.** Distribution of *Fragaria vesca* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Fragaria vesca</i> L.	<i>Fragaria hayatai</i> Makino
<b>Vernacular name</b>	Ropere, Wild strawberry	Endemic to Taiwan
<b>Family</b>	Rosaceae	
<b>Genus</b>	<i>Fragaria</i>	
<b>Distribution</b>	Argentina, Bolivia, Brazil, Canada, China, Colombia, Ecuador, Guatemala, Honduras, Mexico, Peru, South Africa, United States, Venezuela and New Zealand.	Endemic to Taiwan.
<b>Morphology</b>	<p>Low-growing herb with short woody stock, up to c. 15–(25) cm high; runners greenish, pilose, bracteate, and rooting at nodes and tips to form new rosettes. Leaflets ovate to rhombic or elliptic, obtuse to subacute, cuneate at base, <math>\pm</math> thin, bright green above and usually sparsely to moderately silky pilose, paler below. Petals obovate, up to 8 mm long, sometimes only slightly &gt; sepals, rounded, sometimes undulate, spreading, white. Achenes uniformly scattered over and projecting from the receptacle; receptacle usually red, occasionally white, swollen and juicy, sweet, fragrant, obconic.</p> <p>Perennial herbs, villous. Stems multi-branched, slender, rooting at nodes of stolons, roots filiform. Leaves radical, alternate, usually in rosettes, 3-foliolate, leaflets obovate to rhombic, villose pubescent on both surfaces, especially along the veins beneath; petioles elongate, villous. Flowers several in cymes; petals 5, white, elliptic; Achenes numerous, receptacles enlarged and fleshy after flowering, red, fragrant at maturity.</p>	
<b>Content</b>	The plant contains flavonols, flavan-3-ols, flavanones, anthocyanins, hydroxycinnamic acid derivatives, ellagic acid, eugenol, methyl benzoate, methyl cinnamate T, furaneol, ionone, limonene, linalool, linalool, myrtenol, nerol, nerolidol, terpineol, ellagitannins, proanthocyanidins and quercetin <sup>[48-51]</sup> .	The fruit contains sugars and dyes.
<b>Traditional use</b>		The receptacle can be ingested, used to make alcoholic beverages and jam. The whole plant can be used to stop bleeding and expel pus. It has curative effects for pulmonary static blood.
<b>Biological activity</b>	The plants have antioxidant, antidiabetic, hypoglycemic activity, The leaves have vasodilating medicinal properties and anti-inflammatory <i>in vitro</i> <sup>[51-54]</sup> .	





**Figure 11.** Perennial herbs, villous. Stems multi-branched, slender, rooting at nodes of stolons, roots filiform. Leaves radical, alternate, usually in rosettes, 3-foliolate, leaflets obovate to rhombic, villose pubescent on both surfaces, especially along the veins beneath; petioles elongate, villous. Flowers several in cymes; petals 5, white, elliptic; Achenes numerous, receptacles enlarged and fleshy after flowering, red, fragrant at maturity.

**Table 12.** Distribution of *Geum urbanum* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Geum urbanum</i> L.	<i>Potentilla discolor</i> Bunge
<b>Vernacular name</b>	Kopata, Wood avens	Potentilla discolor
<b>Family</b>	Rosaceae	
<b>Genus</b>	<i>Geum</i>	<i>Potentilla</i>
<b>Distribution</b>	United States and New Zealand.	Northeastern, northern and eastern China, Shenhsi, Ssuchuan, and Taiwan.
<b>Morphology</b>	Erect herb arising from a short rhizome; stem moderately stout to slender, 30–40–(60) cm high at flowering, branched, moderately to densely clothed in long and short hairs. Lvs both basal and cauline; basal lvs grooved and pilose; blade ovate to obovate, hairy above, hairy below especially on veins; cauline lvs decreasing in size upwards, with ± orbicular dissected stipules; inflorescences a few-flowered loose cyme; peduncles densely clothed in short and long hairs. Petals rounded, yellow. Achenes hairy.	
<b>Content</b>	The plant contains cyanidins, pedunculagin, stachyurin, casuarynin, gemin A, ellagic acid, saligenin and quinol.	The roots contain tannins and flavonoids. The whole plant contains fumaric acid, gallic acid, protocatechuic acid, quercetin, naringenin, kaempferol and m-phthalic acid.
<b>Traditional use</b>	The plant used for diarrhoea and dysentery <sup>[57]</sup> . <i>G. urbanum</i> root infusions and decoctions have been used externally for reducing the bleeding and inflammation of gums (gingivitis), and mucous membranes <sup>[55-58]</sup> .	It can be used to clear heat and resolve toxins and cool blood to stop bleeding. It has curative effects for pulmonary fire induced coughing and difficulty of breathing, dysentery, malaria, hemoptysis, hematemeses, blood in stool, flooding, carbuncles, sore toxins and tuberculosis. It was discovered that quercitrin and gallic acid have the strongest antiseptic effects.
<b>Biological activity</b>	Its main constituent gemin A, support the traditional use of this plant in cavity inflammation including mucositis, gingivitis and periodontosis <sup>[55]</sup> .	The plants have anti-tumor activity and induction of apoptosis <i>in vitro</i> . The extracts have antidiabetic, antioxidant and anti-hyperglycemic <i>in vivo</i> <sup>[59-61]</sup> .



**Figure 12.** Perennial herbs; roots thick, fleshy, usually spindle-like. Stems erect, densely white tomentose. Leaves imparipinnate, leaflets sessile, oblong or oblong-lanceolate, densely white tomentose beneath; petioles densely white tomentose. Flowers bisexual, in cymes; petals 5, yellow, obovate, emarginate or rounded, longer than calyx; styles terminal. Achenes reniform, glabrous.

**Table 13.** Distribution of *Hypericum perforatum* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Hypericum perforatum</i> L.	<i>Hypericum sampsonii</i> Hance
<b>Vernacular name</b>	Hypericaceae, St John's wort	Hypericum sampsonii

<b>Family</b>	<i>Hypericaceae</i>	
<b>Genus</b>	<i>Hypericum</i>	
<b>Distribution</b>	Canada, Chile, Kazakhstan, Kyrgyzstan, Mongolia, Russian, South Africa, United States and New Zealand.	South of Yangtze River basin and Taiwan.
<b>Morphology</b>	Herbaceous perennial, woody stock, rhizomatous, up to 1 m high. Stems erect, terete, 2-lined, black glands present on lines, sparse. Leaves elliptic-oblong, lanceolate, linear-lanceolate or oblong-lanceolate, glabrous, reticulate tertiary veins absent. Inflorescence terminal, panicle of corymbose cymes. Petals obovate, golden, black glands scattered on margin and blade, persistent after anthesis. Fruit capsule, ovoid, brown or light brown, vesicular glands prominent on surface. Seeds oblong, terete, bronze, ribs absent, apices obtuse or rounded.	
<b>Content</b>	The plant contains hypericin, benzoic acids, phenylpropanoids, coumarins, flavones, flavonols, flavan-3-ols, anthocyanins, phloroglucinols, catechin, epicatechin, quercetin, quercetin 3-O-rhamnoside, quercetin 3-O-glucoside, neochlorogenic acid, proanthocyanidins (A and B series) and cyanidin-3-O-glucoside [62].	The aboveground parts contain astragalol, norathyriol, 2,4,6-trihydroxybenzophenone, betulinic acid, emodin, hypericin, hyperoside, hyperxanthone, kaempferol, neolancerin, mangiferin, padiaxanthone, quercetin, sampsonione A, B, C, D, E, F, G, H, I, and J, toxyloxanthone B, 1,3,5,6-tetrahydroxyxanthone and 1,6-dihydroxyxanthone.
<b>Traditional use</b>	The plant is used to treat anxiety, pain [63].	It can be used to treat hematemesis, hemoptysis, blood strangury, enteritis, dysentery, acute mastitis, carbuncles and sore toxins, scalds, venomous snake bites, menstrual irregularities, dysmenorrhea, leucorrhea, traumatic injuries, wind dampness obstructive pains, lumbago and leg pain. External application can be used to treat head lice, oral cavity ulcers and corneal opacity.
<b>Biological activity</b>	It is concluded through scientific studies that usages include anti-bacterial, anti-inflammatory and anti-nociceptive properties [64,65]. As well as treatment of mild to moderately severe depression.	The plants have cytotoxic and anti-inflammatory activities <i>in vitro</i> [66-68].



**Figure 13.** Perennial herbs, about 65 cm tall. Stems simple, erect, cylindrical, glabrous, woody at base, branched in upper part. Leaves simple, opposite, perfoliate, ascending, silvery, oblong-lanceolate, with numerous pale and dark glandular dots on both surfaces. Inflorescences dichasial cymes, terminal or axillary, flowers small; petals 5, yellow. Capsules ovoid, 3-celled, with reddish brown glands. Seeds numerous, tiny, pale brown.

**Table 14.** Distribution of *Ipomoea batatas* (L.) Lam.

	New Zealand(Maori)	Taiwan
<b>Scientific name</b>	<i>Ipomoea batatas</i> (L.) Lam.	
<b>Vernacular name</b>	Kumara, Sweet potato	
<b>Family</b>	Convolvulaceae	
<b>Genus</b>	<i>Ipomoea</i>	
<b>Distribution</b>	Tropical America; cultivated in Taiwan and New Zealand.	
<b>Morphology</b>	Tuberous-rooted perennial. Stems trailing or erect, glabrous or hairy. Inflorescences. an axillary cyme, usually few-flowered. Corolla funnellform, pink with purplish or reddish purple centre. [18].	
<b>Content</b>	The rhizome contains ellagic acid and 3,5-dicaffeoylquinic acid.	
<b>Traditional use</b>	The plant is used to treat burns, skin diseases.	The rhizome tonifies the internal organs and soothes blood, boosts qi and promotes fluid generation, widens the intestines and the stomach and relieves constipation. It is used to treat edema due to spleen deficiency, diarrhea, ulcers and pyogenic infections. The stem has therapeutic effects on stomach pain and flooding. It is also applied externally to treat vascular spasms.
<b>Biological activity</b>	<i>I. batata</i> is rich in anthocyanin which possess hepatoprotective activities. It is the anthocyanins that remove hydroxyl radicals and reduce the occurrence of lipid peroxidation. Studies have shown the leaves of the plant to have properties such as anti-oxidant activity, anti-mutagenicity, anti-cancer, anti-carcinogenesis, anti-microbial, anti-diabetic and anti-inflammation. The leaves are found to inhibit $\alpha$ -glucosidase while the potato itself inhibits $\alpha$ -amylase, $\alpha$ -glucosidase, and xanthine oxidase [69-71]. A hot water extract of <i>I. batatas</i> has a fairly strong inhibitory effect on aldose reductase of the eye lens. Effective components isolated from <i>I. batatas</i> are ellagic acid and 3,5- dicaffeoylquinic acid.	



**Figure 14.** Herbs, annual. Roots globose, ellipsoid or spindle shaped. Branches creeping or erect, rarely twining, cylindrical or striate, green or purple; usually rooting. Leaves simple, alternate, variable in shape and color depending on cultivar, usually broadly ovate, both surfaces glabrous or sparsely hairy. Inflorescences compound cymes; corolla pink, white, purplish or purple, campanulate or salverform.

**Table 15.** Distribution of *Lagenaria siceraria* (Molina) Standl.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Lagenaria siceraria</i> (Molina) Standl	<i>Lagenaria leucantha</i> (Molina) Rusby var. <i>depressa</i> Makino
<b>Vernacular name</b>	Wenewene, Calabash	White flower gourd
<b>Family</b>	<i>Cucurbitaceae</i>	
<b>Genus</b>	<i>Lagenaria</i>	
<b>Distribution</b>	Argentina, Belize, Bolivia, Cape Verde, Chile, Costa Rica, Ecuador, El Salvador, French Guiana, Gabon, Ghana, Guatemala, Guyana, Honduras, Madagascar, Mauritius, Mexico, Nicaragua, Panama, Paraguay, Peru, Reunion Island, Rodrigues Island, South Africa, Suriname, United States, Uruguay, Venezuela and New Zealand.	Widely cultivated in Mainland China and Taiwan.
<b>Morphology</b>	Vigorous annual herb. Stems prostrate or climbing, angular, ribbed, thick, brittle, softly hairy, cut stems exude no sap. Leaves simple, shortly and softly hairy, broadly egg, kidney- or heart-shaped in outline, undivided, lobes rounded, margins shallowly toothed, crushed leaves non-aromatic. Leaf stalks thick, often hollow, densely hairy, with two small, lateral glands inserted at the leaf base. Flowers stalked (female flower stalks shorter than male), solitary, monoecious (male and female flowers on the same plant); petals 5, crisped, cream or white with darker veins, pale yellow at the base, obovate, opening in the evenings, soon wilting. Fruit large, variable, subglobose to cylindrical, flask-shaped or globose with a constriction above the middle; fleshy, densely hairy to ultimately glabrous, indehiscent, green, maturing yellowish or pale brown [72].	
<b>Content</b>	The plant contains triterpenoid cucurbitacins B, D, G, H, 22-deoxy, fucosterol, campesterol, aerpene byonic acid, flavone-C glycosides and Lagenin [73].	The fruit contains cucurbitacin D.
<b>Traditional use</b>	<i>L. siceraria</i> fruits are traditionally used for its cardioprotective, cardiotonic, general tonic, diuretic, aphrodisiac, antidote to certain poisons, scorpion stings, alternative purgative and cooling effects. It cures pain, ulcers and fever and is used for pectoral cough, asthma and other bronchial disorders-especially syrup prepared from the tender fruits.	The fruit drains water, clears heat, quenches thirst and resolves restlessness. It is used to treat edema and stomach fullness, thirst due to heat vexation and sore toxins.
<b>Biological activity</b>	Antihyperlipidemic activity, analgesic, anti-inflammatory activity, diuretic dactivity, antioxidant activity, immunomodulatory activity, hepatoprotective activity, cardioprotective activity and anthelmintic activity [73-75].	Vomiting occurs 20~40 minutes after oral administration of the decoction, acute stomach pain and diarrhea happens after 9 hours and restoration occurs after 18 hours. Through analysis it was determined that such effects are related to cucurbitacin D in the fruit.



**Figure 15.** Herbs, annual, monoecious, scandent, 2~5 m long. Stems: branches grooved, sticky pilose, hair gradually shed after maturity. Leaves alternate, ovate-cordate or reniform-ovate, serrate. Staminate flowers: calyx tube funnelform, lobes lanceolate; corolla white, lobes undulate. Pistillate flowers: calyx and corolla same as in staminate flowers. Fruit shape variable, greenish white, mesocarp and endocarp white.

**Table 16.** Distribution of *Nasturtium officinale* W.T. Aiton.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Nasturtium officinale</i> W.T. Aiton	<i>Eutrema japonicum</i> (Miq.) Koidz.
<b>Vernacular name</b>	Kowhitiwhiti, Watercress	Japanese horseradish
<b>Family</b>	Brassicaceae	
<b>Genus</b>	<i>Nasturtium</i>	<i>Eutrema</i>
<b>Distribution</b>	Bolivia, Canada, China, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Madagascar, Mexico, Nicaragua, Panama, United States, Venezuela and New Zealand.	In shady valleys of Japan; cultivated in Ali Shan area in Taiwan.
<b>Morphology</b>	Perennial stoloniferous herb. Stems trailing, glabrous, to several m long. Leaves glabrous, all similar, but becoming smaller near inflorescences., pinnate; basal auricles small; leaflets rounded, ovate. Petals white, seeds distinctly in 2 rows per locule, brown, coarsely reticulate with 20–50 polygonal depressions per face.	
<b>Content</b>	The root contains coumaric acid, sinapic acid, caftaric acid, quercetin and solanine A [76,77].	The whole plant contains sinigrin, which decomposes into allyl isothiocyanate with the addition of water, i.e., allyl mustard oil. [8]
<b>Traditional use</b>	The plant is used to treat headache.	The rhizome can increase one's appetite and has antiseptic and pain suppressing effects. It is used to treat rheumatism and neuralgia by applying it to the affected parts because it can reduce pain. The juice can detoxify fish and bird meat poisons.
<b>Biological activity</b>	The extract has anti-DNA damage and antioxidant. The leaves extract can be helpful in reducing the complications of hyperglycemia and dyslipidemia associated with diabetes. Lowered total cholesterol, triglyceride and low density lipoprotein cholesterol levels were noted and an increase in HDL-C [78-82]. Several reports have been published on this herbal plant and have indicated anti-tumour activities, cure hepatic damage, asthma, inflammation, trachitis, and cough [83].	The allyl mustard oil has a volatile irritating aroma that causes tearing; blisters result if the mustard oil contacts the skin.



**Figure 16.** Perennial herbs. Rhizomes stout, pyramidal, leaf scars conspicuous, with numerous fibrous roots. Leaves several, arising among roots, base cordate, irregularly inconspicuously toothed. Stems several, arising among leaves. Inflorescence a short raceme, terminal or axillary. Flowers cruciform; petals 4, white, oblong.

**Table 17.** Distribution of *Plantago major* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Plantago major</i> L.	
<b>Vernacular name</b>	Kopakopa, Plantago major	
<b>Family</b>	Plantaginaceae	
<b>Genus</b>	<i>Plantago</i>	
<b>Distribution</b>	Tropical to temperate Eurasia, including Taiwan; seashores and roadsides. And New Zealand.	
<b>Morphology</b>	Hairy or occasionally glabrous short-lived perennial herb with stout caudex and many large adventitious roots, occasionally with persistent, well-developed primary roots. Lvs all radical, rosulate; Spikes dense, narrow-cylindric. Bracts ovate, herbaceous and keeled, glabrous, sometimes with membranous margin. Corolla tube = or slightly < calyx; capsule usually 2.5–4 mm long, broad-ellipsoid, 6–16-seeded. Seeds slightly trigonous but also rather irregular, rugose, dark red, brown, dark brown or black.	
<b>Content</b>	The whole plant contains ursolic acid, n-hentriacontane, $\beta$ -sitosterol, stigmasterol.	
<b>Traditional use</b>	After the stems and leaves are dried in the shade and then decocted, the decoction can treat gastric diseases, malaria, eye diseases and strangury. It can also clear heat, promote urination and act as a body strengthening medicine. Juice from the leaves can thin saliva. The decoction made from the fruits and an equal amount of alcohol is effective for dystocia. It is also a parasite expellant for infants.	

<b>Biological activity</b>	It can promote mucous secretion of the trachea and bronchia, inhibit the respiratory center, suppress coughing, dissipate inflammation, heal ulcers, modulate the immune system, inhibit Salmonella, malaria and viruses, lower blood pressure and lower blood sugar. It has anti-inflammatory, analgesic, antioxidant, antibiotic, immuno modulating and antiulcerogenic activity <sup>[84-86]</sup> .
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**Figure 17.** Herbs, perennial. Leaves simple, radical. Inflorescences spikes; flowers numerous, densely arranged, usually glabrous; corolla white. Capsules ellipsoid. Seeds 6~16, black.

**Table 18.** Distribution of *Rorippa palustris* (L.) Besser.

	<b>New Zealand (Maori)</b>	<b>Taiwan</b>
<b>Scientific name</b>	<i>Rorippa palustris</i> (L.) Besser	<i>Rorippa indica</i> (L.) Hiern
<b>Vernacular name</b>	<i>Panapana</i> , <i>Rorippa palustris</i>	<i>Rorippa indica</i>
<b>Family</b>	<i>Brassicaceae</i>	
<b>Genus</b>	<i>Rorippa</i>	
<b>Distribution</b>	Afghanistan, Bhutan, Bolivia, Canada, China, Colombia, Ecuador, India, Japan, Kazakhstan, Mongolia, Nepal, Nicaragua, Pakistan, Panama, Russian Federation, South Korea, Suriname, Tajikistan, Turkmenistan, United States and New Zealand.	China and Taiwan.
<b>Morphology</b>	Perennial, rarely annual, taprooted herb. Stems erect, rarely decumbent, glabrous or hairy. Leaves glabrous or hairy; margins toothed. Rosette leaves petiolate, auriculate at base, deeply pinnatifid to pinnate. Stem leaves similar to rosette leaves, auriculate at base, becoming smaller with narrower lobes above, the uppermost sometimes simple. Petals yellow, = sepals. Seeds pale brown, finely colliculate, in 2 rows per locule.	
<b>Content</b>	The plant contains kaempferol, quercetin, gallic, coumaric, ferulic acids and delphinine <sup>[87]</sup> .	The plant contains guconasturtiin and vitamins, proteins, fats, sugars and amino acids. The seeds contain erucic acid and glucosinolate.
<b>Traditional use</b>	An antiscorbutic. Leaves boiled, eaten as cabbage.	The whole plant can be used to clear lungs, cool blood, promote urination and resolve toxins. It can be used to treat blood diseases, urinary tract inflammations, swollen and painful furuncles and itchy skin.
<b>Biological activity</b>	The extract has cytotoxicity in carcinoma cell <sup>[88,89]</sup> .	The aqueous extract can inhibit the growth of <i>Escherichia coli</i> . The whole plant regulates menstruation and can disturb ovum implantation and pregnancy, resulting in contraception and abortion.



**Figure 18.** Aquatic perennial herbs, glabrous. Stems decumbent or floating on water, much branched, with adventitious roots from nodes. Leaves odd pinnate, widely ovate, oblong or suborbicular: terminal leaflet larger; lateral leaflets similar to terminal, base oblique. Inflorescence a terminal raceme, many-flowered. Petals white, obovate or widely spatulate, conspicuously veined; seeds biseriate in a locule, compressed-orbicular or slightly elliptic, reddish brown, surface conspicuously reticulate.

Table 19. Distribution of *Solanum nigrum* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Solanum nigrum</i> L.	
<b>Vernacular name</b>	Remuroa, Black night shade	
<b>Family</b>	Solanaceae	
<b>Genus</b>	<i>Solanum</i>	
<b>Distribution</b>	Temperate Asia, Europe, India, Taiwan and New Zealand.	
<b>Morphology</b>	Unarmed, annual or short-lived perennial herb to c. 75 cm tall, usually hairy, sometimes nearly glabrous; stems branched, usually green, sometimes dark purple; hairs usually scattered, short, simple, occasionally glandular. Cymes pseudoumbellate, usually few-flowered. Corolla usually white, sometimes pale mauve; berry globose, usually black and rather dull, sometimes green, yellowish green or pale yellow; seeds broad-obovoid, ellipsoid-obovoid to suborbicular. Herbs, annual, 30~80 cm tall. Stems ridged, with hairs along ridges. Leaves alternate, ovate, lanceolate-ovate to elliptic. Inflorescences compound cymes lateral. Flowers purplish white; corolla spreading horizontally, 5-lobed, lobes lanceolate-ovate. Berries globose, black at maturity.	
<b>Content</b>	The plant contains solanine, solasolanine, solamargine and solasodine. Additionally, it contains diosgenin, tigogenin and vitamin A.	
<b>Traditional use</b>	The plant is used as vegetable and fruits <sup>[90]</sup> .	The whole plant clears heat, promotes urination, resolves toxins, activates blood and reduces swelling. It is used to treat rooted furuncles, carbuncles, erysipelas, traumatic injuries, sprains, chronic bronchitis and acute nephritis. Additionally, it is also used to inhibit cancer.
<b>Biological activity</b>	The extract of the whole plant has inflammation dissipating effects. It has protective effects for shocks due to allergies, scalds and histamine. Solasonine can reduce blood vessel permeability and hyaluronidase activities. It can also reduce blood coagulation. The fruit can suppress coughs and expel phlegm.	



Figure 19. Herbs, annual, 30~80 cm tall. Stems ridged, with hairs along ridges. Leaves alternate, ovate, lanceolate-ovate to elliptic. Inflorescences compound cymes lateral. Flowers purplish white; corolla spreading horizontally, 5-lobed, lobes lanceolate-ovate. Berries globose, black at maturity.

Table 20. Distribution of *Sonchus oleraceus* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Sonchus oleraceus</i> L.	<i>Sonchus arvensis</i> L.
<b>Vernacular name</b>	Pororua, Common sowthistle	Sonchus arvensis
<b>Family</b>	Asteraceae	
<b>Genus</b>	<i>Sonchus</i>	
<b>Distribution</b>	Argentina, Belize, Bolivia, Brazil, Canada, Caribbean, Chile, China, Colombia, Costa Rica, Ecuador, El-Salvador, Gabon, Greenland, Honduras, Kenya, Madagascar, Mexico, Nicaragua, Panama, Paraguay, Peru, South Africa, Tanzania, Uganda, United States, Uruguay, Venezuela and New Zealand	China (Anhui, Chungching, Fuchien, Kuangtung, Kuanghsi, Kueichou, Hopei, Heilungchiang, Honan, Hupei, Hunan, Chiangsu, Chianghsi, Chiling, Liaoning, Shantung, Shanhsi, Ssuchuan, Yunnan, Chechiang) and Taiwan; also Japan, Korea, Mongolia, E Russia, Vietnam.
<b>Morphology</b>	Annual. Roots tap and fibrous. Stem erect, simple or branched, finely grooved or ribbed, glabrous. Lvs soft, dull to ± shiny, mid to dark green to glaucous above, pale to glaucous beneath, glabrous, ± oblanceolate to obovate. Infl. cymose to umbellate. Corolla tube c. = ligule; ligules spreading, yellow. Pappus fine, white, c. = involucre.	
<b>Content</b>	The plant contains caftaric acid, chlorogenic acid, chicoric acid, villosol, ferulaic acid, β-sitosterol, ursolic acid and rutin.	The plant contains palmitic acid, β-sitosterol, daucosterol, quercetin, apigenin- 7-O-β-D-glucopyranoside, luteolin-7-O-β-D-glucopyranoside, quercetin-3-O-β-Dglucopyranoside, rutin.
<b>Traditional use</b>	The whole plant is used for rash, stomach pains, phlegm, bleeding from birth, blood purification. It has anti-septicemia, laxative, anti-tetanus characteristics.	The whole plant has heat clearing, toxin resolving, swelling dispersing and pain easing effects. It is used to treat carbuncle, furunculosis, mastitis, throat swelling and pain, jaundice, dysentery, strangury, leucorrhoea and traumatic injury.
<b>Biological activity</b>	The leaves possess antidiabetic and antioxidant properties. The extract has anti-inflammatory, anti-tumor.	It possesses antioxidant, antibacterial <sup>[91-97]</sup> and antimicrobial <sup>[98]</sup> activity and is also useful in the prevention of hepatic stress <sup>[91-99]</sup> .



**Figure 20.** Herbs, perennial, 30~80 cm tall. Whole plant glabrous. Stems erect, much branched, reddish purple. Cauline leaves alternate, ligulate ovate, sessile. Florets all ligulate, yellow. Achenes dark brown, fusiform, slightly compressed. Pappus white.

**Table 21.** *Taraxacum officinale* (L.) Weber ex F.H. Wigg.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Taraxacum officinale</i> (L.) Weber ex F.H. Wigg	<i>Taraxacum formosanum</i> Kitam
<b>Vernacular name</b>	Tawao, Dandelion	Taraxacum formosanum.
<b>Family</b>	Asteraceae	
<b>Genus</b>	<i>Taraxacum</i>	
<b>Distribution</b>	Argentina, Canada, Chile, Guatemala, Kazakhstan, Kyrgyzstan, Madagascar, Panama, South Africa, United States and New Zealand.	Endemic in Taiwan.
<b>Morphology</b>	Perennial rosette herb. Lvs all basal, linear-oblong to obovate, runcinate-pinnatifid to not lobed, toothed. Involucral bracts glabrous. Florets golden yellow. Pappus white, 5–7 mm long. Herbs, perennial. Taproot cylindrical or long fusiform, stout, deep underground. Rhizome short. Whole plant laticiferous. Leaves densely clustered, rosulate, prostrate or ascending, oblanceolate, pinnae unequal, terminal pinna deltoid or hastate, short petiolate or sessile. Involucre cotyliform. Florets yellow, all ligulate, bisexual, apex 5-lobed. Pappus white, forming a globose cluster.	
<b>Content</b>	The cichoriin, aesculin, hydroxycinnamic acids, chicoric acid, mono caffeoyl, tartaric acid and chlorogenic acid, sesquiterpene lactones, phenylpropanoids, triterpenoids, luteolin and luteolin-7-O-glucoside were found throughout the plant and the coumarins, cichoriin and aesculin were identified in the leaf extracts.	The whole plant contains taraxasterol, choline, unulin and pectin.
<b>Traditional use</b>	Leaves sometimes cooked as greens.	The extract and decoction all have antiseptic and bile draining effects. Clinically, <i>Taraxacum formosanum</i> has curative effects for chronic gallbladder spasms, calculus diseases and interstitial edema. Oral administration of the leaf effusion has curative effects on snakebites and can promote breast milk secretion in females.
<b>Biological activity</b>	The plants have antioxidant, anti-inflammatory activity <i>in vitro</i> and <i>in vivo</i> [100-106]. The extract has anti-nociceptive and anti-angiogenic effects <i>in vitro</i> .	The whole plant can be used to treat acute tonsillitis, lymphadenitis, scrofula, furunculosis and pyogenic infections, acute conjunctivitis, fevers of the common cold, acute tonsillitis, acute bronchitis, gastritis, hepatitis, cholecystitis, urethritis and mastitis.



**Figure 21.** Herbs, perennial. Taproot cylindrical or long fusiform, stout, deep underground. Rhizome short. Whole plant laticiferous. Leaves densely clustered, rosulate, prostrate or ascending, oblanceolate, pinnae unequal, terminal pinna deltoid or hastate, short petiolate or sessile. Involucre cotyliform. Florets yellow, all ligulate, bisexual, apex 5-lobed. Pappus white, forming a globose cluster.

**Table 22.** Distribution of *Tetragonia tetragonoides* (Pall.) Kuntze.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Tetragonia tetragonoides</i> (Pall.) Kuntze	
<b>Vernacular name</b>	Kokihi, New Zealand spinach	
<b>Family</b>	Aizoaceae	
<b>Genus</b>	<i>Tetragonia</i>	
<b>Distribution</b>	Widely distributed in the coastal regions of Australia, South America, and Southeastern Asia; also in China, Korea, Japan, Ryukyus, New Zealand and Taiwan.	
<b>Morphology</b>	Herb with decumbent branching stems, softly woody towards base, up to 6 dm. long. Leaves on petioles up to 2 cm. long. Flowers solitary or occ. paired, occ. unisexual, sessile or nearly so.; per. yellowish. Fr. subturbinate, angled; seeds 4–10; horns 2–4, indurate.	
<b>Content</b>	The plant contains Fe, Ca, proteins, vitamin A, B, etc. It also contains phosphatidylcholine, phosphatidyl-ethanolamine, phosphatidyl-serine and phosphatidyl-inositol. In addition, it also contains tetragonin, trigonelline, choline, malic acid, citric acid and adenine.	
<b>Traditional use</b>	The leaves are used to treat scurvy. The root can be anti-abscess.	The whole plant can expel cold and clear heat, generate body fluid and quench thirst, resolve toxin, disperse swelling and inhibit cancers. It can treat enteritis, gizzard erosion, poor appetite, thirst, red eyes due to wind-heat, septicaemia, all kinds of cancers, rooted furuncles and pyogenic infections.
<b>Biological activity</b>	The fruit contains fats. The whole plant can counter scurvy and other bacteria. The mucilage can dissipate inflammation.	



**Figure 22.** Annual herb, succulent, densely tomentose, 30~60 cm high; stems much-branched at base, prostrate and widely spreading. Leaves alternate ovate-rhombic to ovate-deltoid, Inflorescence of axillary, 1~2 short-petiolate, yellow flowers. Flowers bell-shaped; Drupes nut-like, rhomboidal, with 4~5-horned, persistent tepals. <sup>[8]</sup>

**Table 23.** Distribution of *Typha orientalis* C. Presl.

	New Zealand(Maori)	Taiwan
<b>Scientific name</b>	<i>Typha orientalis</i> C. Presl	
<b>Vernacular name</b>	Raupo, Broadleaf Cumbungi	
<b>Family</b>	Typhaceae	
<b>Genus</b>	<i>Typha</i>	
<b>Distribution</b>	Australia, Burma, China, Japan, Mongolia, North Korea, Philippines, Russian Federation, South Korea, Taiwan and New Zealand.	
<b>Morphology</b>	Plants 1–3 m. tall, us. growing in large colonies, summer-green. Inflorescences. us. 30 cm. or more long, the female part ultimately c. 2.5 cm. diam., the male part narrower and either continuous with or separated ± widely from the female. filaments at first shorter than anther-width, elongating later; pollen clear yellow, grains single. Female fls very much smaller than male, several grouped on proximal part of a short compound pedicel. Carpodia oblong-obovate, tips just projecting between the hairs. Seed c. 1.2 mm. long, cuneate at base, truncate at tip, yellow. n = 30.	
<b>Content</b>	The pollen contains β-sitosterol, daucosterol, palmitic acid, ethyl palmitate, glyceryl palmitate, hentriacontanol, ignoceric acid and docosanoic acid.	
<b>Traditional use</b>	The plant is used to treat trauma, ulceration, assisted discharge of postpartum.	<i>Typha orientalis</i> stops bleeding, expels stasis and promotes urination. It is used to treat hematemeses, hemoptysis, epistaxis, bloody dysentery, bloody stools, flooding, bleeding from wounds, heart and stomach pains, postpartum stasis-induced pain, dysmenorrhea, traumatic injuries, blood strangury and obstructive pain, leucorrhea, heavy tongue, oral cavity ulcers and wetness and itchiness in the genital area. It stops hemorrhaging, unblocks the meridian, dissipates inflammation and is a diuretic medicine.
<b>Biological activity</b>	An alcohol deposition from the aqueous extract of the pollen promotes coronary circulation of isolated rabbit hearts. The water decoction has been reported to increase arteriole circulation in the cheek pouch of the golden hamster and open up more capillaries. It lowers blood lipids and inhibits arteriosclerosis. It significantly inhibits platelet adhesion and aggregation. It can also slightly increase the activity of anticoagulant III. When the aqueous extract is stomach perfused into pregnant mice during their mid-trimester, it has strong abortive effects and induces the death of the fetus. The pollen appears to have both upregulating and down-regulating effects that can inhibit inflammation and exudation.	





**Figure 23.** Herbs, perennial, monoecious, to 4 m tall, robust, emergent aquatic, rhizomatous, often in dense colonies. Leaves linear. Spikes cylindrical. Staminate flowers with 2~4 stamens, pollen grains solitary; pistil clavate, sterile. Pistillate flowers without bracts, but many white hairs at base, hairs as long as style, stigma spatulate.

**Table 24.** Distribution of *Ulva lactuca* L.

	New Zealand(Maori)	Taiwan
<b>Scientific name</b>	<i>Ulva lactuca</i> L.	
<b>Vernacular name</b>	Karengo, Sea vegetable	
<b>Family</b>	Ulvaaceae	
<b>Genus</b>	<i>Ulva</i>	
<b>Distribution</b>	Global pan-warm temperate seaweeds; widely found in Russia, Korea, Japan, Ryukyu (Okinawa) Islands, China, southeastern Asia and Taiwan. Growing all over sea shores of Taiwan.	
<b>Morphology</b>	This plant is classified as green seaweed and has a soft texture with leafy blades. Each leaf is 2 layers thick and one leaf can grow up to 30cm high with colour variations to all shades of green.	
<b>Content</b>	Ulvan can be extracted from the plant which acts as dietary fiber. Other components include polysaccharides, sulphated uronic acid, sodium, zinc, sulphur, and iron.	
<b>Traditional use</b>	Karengo, the most commonly eaten seaweed.	Promoting urination and subsiding swelling; dissipating hard mass and resolving phlegm; clearing heat and detoxifying. It is used to treat edema, struma, hypertension, high cholesterol, laryngitis, furuncle, acute and chronic enterogastritis and infantile malnutrition.
<b>Biological activity</b>	Studies have shown that it prevents inflammation, bone decalcification and anemia. It also enhances the ability of the liver to eliminate free radicals.	



**Figure 24.** Thalli form grassy green, thin, membranous, only two cell layers, various forms from round, ovate to long oblong; margin undulate, with notch or irregularly lobed, but not to the base; many rhizoids extending downward to form discoid holdfasts.

**Table 25.** Distribution of *Viola odorata* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Viola odorata</i> L.	
<b>Vernacular name</b>	Garden or Florists violet	
<b>Family</b>	Violaceae	
<b>Genus</b>	<i>Viola</i>	
<b>Distribution</b>	Originally in Europe and western Asia and New Zealand. Common in Peking, Tienchin, Sian, Shanghai, Kuangtung; cultivated in Taiwan.	
<b>Morphology</b>	Rhizomatous perennial; aerial stems 0. Lvs all rosulate, with fine hairs above and beneath, broadly ovate-cordate, obtuse to subacute. Petals violet or white or pink, exceeding sepals, the lateral bearded. Capsule globose, hairy. Seeds obovoid, pale brown.	
<b>Content</b>	The plant contains acalyphine, ascorbic acid, cycloviolacin O <sub>2</sub> , rutin, vodo M, vodo N and linalool. The aqueous extract of the flowers and roots exhibit anti-inflammatory and antifungal effects.	

<b>Traditional use</b>	The whole plant can be used to disperse cold and to clear heat, stop coughing and expel phlegm, suppress uneasiness and stop diarrhea. It can be used to treat insomnia, diarrhea, dysentery and corneal opacity.
<b>Biological activity</b>	The aqueous extract of the flowers and roots exhibit anti-inflammatory and antifungal effects. The efficacy of <i>V. odorata</i> in treatment of pain, fever, cough, infection and inflammation makes it as suitable treatment for respiratory ailments. Linalool is a recognised component in the oil and through animal studies have proven to have sedative effects <sup>[107,108]</sup> .



**Figure 25.** Perennial herbs, 3~15 cm tall, acaulescent, with stolons. Rhizomes erect or oblique, pale brown. Leaves radical, round or reniform to widely ovate-cordate, enlarging after flowering. Flowers fragrant; petals dark purple, margin of petals undulate. Capsules globose, densely puberulous.

**Table 26.** Distribution of *Aristolelia serrata* (J.R. Forst. & G. Forst.).

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Aristolelia serrata</i> (J.R. Forst. & G. Forst.)	<i>Elaeocarpus sylvestris</i> (Lour.) Poir.
<b>Vernacular name</b>	Makomako, Wineberry	Common Elaeocarpus
<b>Family</b>	<i>Elaeocarpaceae</i>	
<b>Genus</b>	<i>Aristolelia</i>	<i>Elaeocarpus</i>
<b>Distribution</b>	New Zealand.	Kuangtung and Taiwan, also in Japan.
<b>Morphology</b>	Dioec. tree up to c. 10 m. tall; bark of branchlets rather light to dark red, pubescent. Leaves on slender pubescent petioles, light or dark green above, paler green or purplish below. Inflorescences. paniculate. Flowers on slender pubescent pedicels, 4 petals, seeds ± 8, angled.	
<b>Content</b>	The plant contains aristomakine.	The bark contains 11.92% tannins. The seeds contain 40% oil.
<b>Traditional use</b>	The leaves used to treat burns, rheumatism, pimple, eye pain. The barks used to treat eye pain, rheumatism.	The wood can be made into different objects; the bark can be made into dyes.
<b>Biological activity</b>	The plants have antifungal activity.	The plants have Antioxidant capacity <sup>[108-109]</sup> .



**Figure 26.** Evergreen trees, 18~21 m tall. Leaves alternate, petiolate, oblong-lanceolate, or oblanceolate, remotely serrate, usually turning red before falling. Inflorescences spikes. Sepals lanceolate; petals cuneate, cream, fimbriate at apex. Drupes ellipsoid, dark purple.

**Table 27.** Distribution of *Broussonetia papyrifera* (L.) Vent. (L.) L'Herit. ex Vent.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Broussonetia papyrifera</i> (L.) Vent. (L.) L'Herit. ex Vent.	
<b>Vernacular name</b>	Aute, Paper mulberry	
<b>Family</b>	<i>Moraceae</i>	
<b>Genus</b>	<i>Broussonetia</i>	
<b>Distribution</b>	China, Japan, Thailand, Malaysia, India, Pacific islands, Taiwan and New Zealand.	
<b>Morphology</b>	Dioecious, deciduous, medium-sized tree up to 12(-35) m tall, with white latex present in all parts; bark smooth, dark grey, inner bark consisting of tough interlacing fibres. Leaves alternate, simple; petiole hairy. Inflorescence an axillary catkin; male inflorescence solitary or clustered on short axillary shoot, cylindrical, reddish, many-flowered, densely hairy; female inflorescence globose, hairy. Fruit an oblongoid drupe, 1-seeded, many arranged together in a subglobose. Seed small <sup>[110]</sup> .	
<b>Content</b>	The fruit contains saponins, vitamin B and oil. The seed contains oils, including: unsaponifiable matters, saturated fatty acids, oleic acid and linoleic acid. The leaf contains phenols, organic acids and tannins.	

<b>Traditional use</b>	Used for kites (Meaning: Peaceful times; all going on well; no disturbances). Milk retained in bark, squeezed into infant's mouth during mother's absence.	The fruit has curative effects for consumptive disease, blurred vision, corneal opacity and water qi edema. The root has curative effects for coughing, hematemesis, edema and metrorrhagia and traumatic injury. The white bark has curative effects for edema and qi fullness, shortness of breath induced coughing, bloody dysentery, and metrorrhagia in women. The white juice from the bark can be used to treat edema and tinea, and applied to snake, insect, bee, scorpion and dog bites. The stem has curative effects for rubella, reddish swollen and painful eyes and unsmooth urination. The leaf has curative effects for hematemesis, hemorrhage, metrorrhagia, injury bleeding, edema, hernia, and dysentery and tinea ulcers.
<b>Biological activity</b>	The plants have antioxidant and antibacterial activity. The leaves has anti-inflammatory activity, anti-inflammatory, anti-bacterial and anti-tumour properties. Different studies have shown that the extracts could possibly have cytotoxic effects on cancer cells in bladder, breast as well as hepatic cells [111-119].	



**Figure 27.** Deciduous, small or large dioecious tree; branchlets with dense brown hairs, stems and leaves with latex. Leaves alternate cordate-ovate, villous or pilose; stipules membranous, caduceus. Flowers unisexual; male catkins axillary, cylindrical, pendulous; female flowers in globose-head, with many rod-like bracteoles, hairy; aggregate fruits globose, fleshy, orange-red at maturity.

**Table 28.** Distribution of *Coprosma robusta* Raoul.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Coprosma robusta</i> Raoul	<i>Coffea arabica</i> L.
<b>Vernacular name</b>	<i>Karamu</i>	Coffee
<b>Family</b>	<i>Rubiaceae</i>	
<b>Genus</b>	<i>Coprosma</i>	<i>Coffea</i>
<b>Distribution</b>	New Zealand.	China (southwest, south, east) and Taiwan.
<b>Morphology</b>	Shrub or tree up to 6 m. tall; branches and branchlets spreading, stout, glab. Leaves opp. on rather stout petioles. Stipules connate towards base, obtuse, glab., ♂ corolla subcampanulate, lobes triangular, acute. ♀ corolla narrow-funnel form, lobes acute or obtuse, oblong-triangular. Drupe dark orange to yellow, oblong to narrow-ovoid [103].	
<b>Content</b>	The plant contains 1,3,8-trihydroxy-2-methoxyanthraquinone and copareolatin 6-methyl ether [120,121].	The stems and leaves contain helenalin, psychorubrin and trace elements, such as iron, manganese, copper and zinc.
<b>Traditional use</b>	The sap used to treat dermatological diseases. The leaves used to treat severed limbs, bruises, fever, cuts, kidney disease, sores. The barks used to treat itching, stomach pain, vomiting, sore throat, sexually transmitted diseases. The branch used to treat urinary tract inflammation, cystitis.	The whole plant clears heat and resolves toxins, expels cold and removes dampness, activates blood and eases pain. It is used to treat fever of the common cold, swollen throat and pain, tonsillitis, diphtheria, dysentery, Salmonella infections, winddampness obstructive pain, traumatic injuries and venomous snakebites are also treated.
<b>Biological activity</b>		Psychorubrin from the ethanol extract has an obvious cytotoxicity on human nasopharyngeal carcinoma cells.



**Figure 28.** Shrubs or trees, 4~7 m tall. Leaves leathery, apex acuminate, base cuneate or narrowly cuneate, margins sinuate, both surfaces glabrous; stipules broadly triangular, apex cuspidate on juvenile branches and mucronate on adult branches. Inflorescences cymose, axillary, of several clustered flowers; pedunculate; bracts fused at base. Flowers: corolla white, variable in length. Berries ellipsoid. Seeds oblong, dorsally convex.

**Table 29.** Distribution of *Cordyline australis* (Forst. f.) Hook. f.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Cordyline australis</i> (Forst. f.) Hook. f.	<i>Cordyline fruticosa</i> (L.) A. Chev.
<b>Vernacular name</b>	<i>Ti kauka</i> , Cabbage tree	Good luck plant
<b>Family</b>	Asparagaceae	
<b>Genus</b>	<i>Cordyline</i>	
<b>Distribution</b>	Bolivia and New Zealand.	China (south) and cultivated in Taiwan.
<b>Morphology</b>	Plant to 12–(20) m high; young unbranched stems 5–10 cm diam.; older trees with massive trunk to 1.5m diam., much-branched above. Leaves 30–100 × 3–6 cm, only slightly narrowed above base; midrib indistinct, nerves fine. Panicle lax, 60–150 cm long. Flowers fragrant, white; segments 5–6 mm long. Berry whitish.	
<b>Content</b>	The plant contains glucofructofuranan. The seed oil very rich in linoleic acid. The root contains large quantities of fructose. The leaves contain saponin.	The plant contains fructosides, quercetin 3-O-β-d-glucopyranoside, quercetin 3-O- [6-trans-p-coumaroyl]-β-d-glucopyranoside, quercetin 3-rutinoside and apigenin 8-C-β-d-glucopyranoside and farrerol.
<b>Traditional use</b>	The plant used for cuts, cracks and sores, especially on the hands. The leaves decoction used for dysentery and diarrhea. Young inner shoots and top of stem of cabbage tree boiled and fluid drunk by nursing mothers and children with colic.	The leaves cool blood, stop bleeding, dissipate stasis and ease pain. Used to treat hemoptysis, hematemesis, epistaxis, hematuria, blood in stool, flooding, profuse menstruation, stomach pains, bone and sinew pains and traumatic injuries. The flowers clear heat, resolve phlegm, cool blood and stop bleeding.
<b>Biological activity</b>	The plants have antioxidant, antibacterial and antifungal activity [122-127].	The plants have antimicrobial activity.



**Figure 29.** Shrubs, to 3 m tall. Stems usually unbranched. Leaves clustered in 2 rows at apex of stems, lanceolate-elliptic to oblong, green or reddish violate. Inflorescences panicles, axillary on upper part of stems, branches many. Flowers sub-sessile, perianth segments pinkish or purple, rarely yellowish, linear, fruit capsules, seeds several per locule.

**Table 30.** Distribution of *Dysoxylum spectabile* Hook. F.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Dysoxylum spectabile</i> Hook. F.	<i>Aglaia odorata</i> Lour.
<b>Vernacular name</b>	<i>Kohe</i> , New Zealand mahogany	Orchid trees
<b>Family</b>	Meliaceae	
<b>Genus</b>	<i>Dysoxylum</i>	<i>Aglaia</i>
<b>Distribution</b>	New Zealand.	Fuchien, Kuangtung, Kuanghsi, Ssuchuan, and Yunnan, also cultivated in Taiwan.
<b>Morphology</b>	Tree up to c. 15 m. tall; trunk up to ± 1 m. diam.; branches stout, bark pale. Leaves imparipinnate, pulvinate at base. Lamina somewhat obliquely ovate- to obovate-oblong, coriaceous, abruptly bluntly pointed, undulate. Inflorescences. us. cauliflorous. Petals linear, spreading, waxy white, Staminal column cylindrical, fleshy, toothed; anthers subsessile. Style ± silky-hairy; stigma discoid, slightly exserted, surrounded by thin concentric cup. Capsule broad-obovoid to subglobose, 3–4-celled, ± 25 mm. long., on thickened pedicel. Seeds 2 per cell; aril orange to scarlet [128].	
<b>Content</b>	The plant contains limonoids, methyl ivorensate, 6α-Acetoxyobacunol acetate, Isopimara-8, 15-diene, 7α-Hydroxyisopimara-8.	It contains alkaloids: odorine, odorinol, rocagaol, rocaglamide, desmethylrocaglamide amethyl rocaglate and aglaidin.
<b>Traditional use</b>	The plant is used to treat stomach ache, cough, inhibition of milk secretion, pulmonary hemorrhage, cold, fever, female physiological disorders, sore throat, gonorrhoea, pumping.	The whole plant can be used to expel wind dampness, disperse stasis and swelling. It can be used to treat arthritis caused by damp winds, traumatic injuries, suppurative carbuncles and pyogenic infection.
<b>Biological activity</b>	The plants have antibacterial and anthelmintic properties.	The plants have antibacterial, anti-inflammatory activities [128-132].



**Figure 30.** Evergreen shrubs or small trees, polygamous or monoecious, 4~7 m tall. Stems multi-branched, young branchlets with rusty stellate scales. Leaves alternate, imparipinnate, rachis narrowly winged. Inflorescences paniculate, axillary; petals 5, yellow, oblong to nearly orbicular, strongly fragrant; Berry ovoid or nearly globose, with sparse stellate hairs when young, then glabrate; seeds with fleshy arils.

**Table 31.** Distribution of *Eucalyptus globulus* Labill.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Eucalyptus globulus</i> Labill.	
<b>Vernacular name</b>	Myrtaceae, Tasmanian blue gum	
<b>Family</b>	Myrtaceae	
<b>Genus</b>	<i>Eucalyptus</i>	
<b>Distribution</b>	Native to Australia; cultivated as shade trees in Kuanghsi, Ssuchuan, Yunnan, China, Taiwan and New Zealand.	
<b>Morphology</b>	Large or very large tree; bark rough towards base but peeling in long strips to give a mottled grey and whitish upper trunk and branches. Juvenile lvs opposite for many pairs, sessile, glaucous, ovate, prominently amplexicaul and cordate. Adult lvs with stout petiole to c. 4 cm long; lamina lanceolate, markedly falcate, coriaceous, glaucescent and concolorous, with distinct marginal vein 1–3 mm from margin. Fls axillary, nearly always solitary, sessile or pedicels short and strongly ribbed. Buds strongly verrucose, glaucous-white. Fruit subsessile, hemispheric, truncate or somewhat convex.	
<b>Content</b>	The leaves contain eucalyptol, quercetol, quercetin, quercitrin, rutin, gallic acid, caffeic acid, ferulic acid and gentisic acid. The bark and wood contain caryophyllene, ellagic acid and gallic acid.	
<b>Traditional use</b>	Used for bathing after confinement; if haemorrhage, drink some of water. Inhaled and taken internally as an infusion in asthma. (Uses probably taught by missionaries). Extensively used.	The leaves can be used to treat the common cold, headache due to high fever, pulmonary fire induced coughing, pertussis, distending pain of the stomach, diarrhea, dysentery, hookworm and filarial worm infections, malaria, wind dampness pains, ulcerative carbuncles and pyogenic infections, eczema, scabies, scalds and bleeding from wounds.
<b>Biological activity</b>	The plant has antibacterial, antifungal, antioxidant and anti-inflammatory properties. The aqueous extract of the leaves has inhibitory effects against <i>Staphylococcus aureus</i> and <i>Salmonella paratyphi</i> . The evaporation oil has inhibitory effects against <i>Bacillus subtilis</i> and <i>Staphylococcus aureus</i> . The leaf effusion and leaf oil can be used to expel phlegm and stop coughing [133-139].	



**Figure 31.** Large evergreen trees. Bark grayish blue, exfoliating; twigs slightly ridged. Young leaves opposite, sessile, ovate, glaucescent, base cordate; mature leaves lanceolate, falcate, leathery, both surfaces glandular; inflorescences axillary, solitary or 2- or 3-flowered, sessile or with short peduncle. Flowers 4 cm wide; capsules semiglobose, 4-ridged, disk wide, valves equaling calyx tube rim.

**Table 32.** Distribution of *Hebe salicifolia* (G. Forst.) Pennell *Veronica salicifolia* G. Forst.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Hebe salicifolia</i> (G. Forst.) Pennell <i>Veronica salicifolia</i> G. Forst.	<i>Plantago asiatica</i> L.
<b>Vernacular name</b>	Koromiko, Willow-leaf hebe	Plantain
<b>Family</b>	Plantaginaceae	

<b>Genus</b>	<i>Hebe</i>	<i>Plantago</i>
<b>Distribution</b>	Bolivia, Chile and New Zealand.	China and Taiwan.
<b>Morphology</b>	Diffusely branched shrub to 5 m. tall. Branchlets pale green, glab.. Lvs suberect to spreading, long-lanceolate, submembr.; lamina conspicuously narrowed towards apex and long-acuminate, on margins of young lvs and especially on expanded midrib of petiole. Infls lateral, simple. Fls rather close but not hiding rhachis; corolla white or very pale lilac-tinted, tube rather wide, shortest at the back.	
<b>Content</b>	The plant contains hebeoside, salidroside, arbutin and Mannitol.	The plant contains ursolic acid, n-hentriacontane, $\beta$ -sitosterol, stigmasterol, $\beta$ -sitosteryl, palmitate, plantagin, plantamajoside and hellicoside. The leaves contain homoplantagin. The roots contain stachyose, sucrose and raffinose.
<b>Traditional use</b>	The leaves are used to diarrhea, kidney disease, cystitis, skin diseases, headaches, laxatives, help with childbirth, itching, sexually transmitted diseases. The buds are used to treat diarrhea and vomiting.	The whole plant can be used to treat heat binding in the bladder, irregular urination, turbid stranguria, diarrhea due to summer dampness, hematuria, hepatic fire-induced red eyes, swollen throat and pain, carbuncles and pyogenic infections.
<b>Biological activity</b>	<i>H. salicifolia</i> can be used to treat kidney failure caused by oliguria, as well as other causes of inadequate renal function <sup>[139-141]</sup> .	<i>Plantago asiatica</i> can increase the discharge of urea, uric acid and sodium chloride to achieve diuretic effects. It can promote mucous secretion in the trachea and bronchia. It also suppresses coughs and dissipates inflammation.



**Figure 32.** Herbs, perennial, scapose 50 cm tall. Leaves radical, blade ovate or elliptic, sinuate to few shallow dentate. Scapes several, ridged. Inflorescences spicate. Flowers pale green; corolla membranaceous. Capsules ovoid-conical. Seeds 4~9, subellipsoid, blackish brown.

**Table 33.** Distribution of *Hoheria populnea* A. Cunn.

	<b>New Zealand (Maori)</b>	<b>Taiwan</b>
<b>Scientific name</b>	<i>Hoheria populnea</i> A. Cunn.	<i>Malvastrum coromandelianum</i> (L.) Garcke
<b>Vernacular name</b>	Houhere, New Zealand mallow	Ulm-leaved false mallow
<b>Family</b>	<i>Malvaceae</i>	
<b>Genus</b>	<i>Hoheria</i>	<i>Malvastrum</i>
<b>Distribution</b>	New Zealand.	Native to the Americas; in Fuchien, Kuangtung, Hainan, Kuangsi and Yunnan provinces, China, and Taiwan.
<b>Morphology</b>	Tree up to 10 m. tall or more; glab. or nearly so, except for stellate pubescence on young parts and Inflorescences. Branchlets slender, grooved, with pale bark. Juvenile plant similar in lf-form to adult or sts with branchlets very slender, divaricate, $\pm$ entangled, leaves on reversion shoots similar. Adult plant with leaves on petioles up to c. 2 cm. long, deeply, coarsely, $\pm$ doubly, serrate-dentate. Fls both solitary and in (2)–5–10-flid cymose clusters on same plant; petals white.	
<b>Content</b>	The plant contains rhamnase, galactose, galacturonic acid and glucuronic acid.	The phytoconstituents reported from aerial parts of the plant are $\beta$ -phenylethylamine, dotriacontane, dotriacontanol, $\beta$ -sitosterol, stigmasterol, campesterol, lutein, N-methyl- $\beta$ -phenylethylamine, indole alkaloids.
<b>Traditional use</b>	The bark is used to treat cold, visual fatigue, eye pain, burns. The leaves are used to treat stomachache.	The whole plant can be used to clear heat and drain dampness, resolve toxins and reduce swelling. It can be used to treat heat dampness diarrhea and dysentery, jaundice, pulmonary fire induced coughing, swelling pain of the throat, hernia, carbuncles, sore toxins, traumatic injuries and prostatitis.
<b>Biological activity</b>	The plants have antimicrobial and antiviral activity <sup>[142-144]</sup> .	The water extract of the whole plant can be used to clear heat, ease pain, and has anti-inflammatory effects. The water extract of the aboveground parts helps to decrease blood sugar and blood lipids and has antiseptic effects.



**Figure 33.** Subshrubs, to 1 m tall. Stems erect, sparsely pubescent and stellate. Leaves alternate, ovate-lanceolate or ovate, serrate, sparsely pilose above, sparsely stellate-pilose below. Flowers solitary, axillary, pilose; corolla yellow; petals 5, obovate. Capsules 6 mm wide, sparsely stellate.

**Table 34.** Distribution of *Leptospermum scoparium* J.R. Forst. & G. Forst.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Leptospermum scoparium</i> J.R. Forst. & G. Forst.	<i>Rhodomyrtus tomentosa</i> (Aiton) Hassk.
<b>Vernacular name</b>	Manuka, Manuka myrtle	Hill gooseberry, Rose myrtle
<b>Family</b>	Myrtaceae	
<b>Genus</b>	<i>Leptospermum</i>	<i>Rhodomyrtus</i>
<b>Distribution</b>	United States and New Zealand.	Fuchien, Kuangtung, Kuanghsi, Hainan, Hunan, Kueichou, Yunnan, China, and Taiwan.
<b>Morphology</b>	Shrub of diverse habit, or tree up to c. 4 m high. Bark shedding in long strips. Branchlets and young Leaves ± clothed in silky hairs. Leaves subsessile, of 2 main forms on different plants, narrow-lanceolate or ovate, coriaceous, rigid, acute, pungent, erect to patent. Fls axillary, or occasionally terminal on branchlets, ± sessile, usually solitary. Hypanthium broadly turbinate; petals ± suborbicular, usually white, patent. Capsule 5-celled, 3–7 × 4–10 mm, woody, long-persistent, distinctly exerted beyond receptacle rim.	
<b>Content</b>	The plant contains methylglyoxal, dihydroxyacetone, hydrogen peroxide, methylglyoxal, dihydroxyacetone, fructose, glucose, lepteridine, maltol glucoside, triketone and carbohydrate dihydroxyacetone.	The plant contain tannins and phenols; the fruit contains flavonoid glycosides, phenols, amino acids, organic acids and saccharides.
<b>Traditional use</b>	The plant is used to treat diarrhea, belching, fever, trauma, abscess, burns, burns, constipation, sedatives, dysentery, skin diseases, pain, fever, mouth, throat, eye problems, mastitis, colds, urinary inflammation, and gastroenteritis.	The root and wood can be used to expel cold and stop diarrhea. They can be used to treat arthritis caused by damp winds, neuralgia, traumatic injuries, dysentery and diabetes.
<b>Biological activity</b>	The plants have antioxidant, antimicrobial and anti-inflammatory activity. It is effective against Gram-positive bacteria and the nectar of the flower contains carbohydrate dihydroxyacetone and has anti-microbial activities.	The leaf extract has a strong antibacterial activity against the bacterial pathogen <i>Streptococcus pyogenes</i> . The methanol extract has anti-inflammatory <i>in vitro</i> and <i>in vivo</i> [145-156].



**Figure 34.** Small evergreen shrubs, to 2 m high; twigs grayish tomentose. Leaves opposite; pubescent when young, glabrescent and shiny with age, lower surface grayish tomentose. Flowers purplish red, solitary, long pedicellate; petals 5, obovate. Berries purplish black at maturity, ovoid-urceolate. Seeds numerous, in 2 rows in each locule.

**Table 35.** Distribution of *Macropiper excelsum* Miq.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Macropiper excelsum</i> Miq. <i>Piper excelsum</i> (G. Forst) Miq	<i>Piper betle</i> L.
<b>Vernacular name</b>	Kawakawa, Piper excelsum	Betle
<b>Family</b>	Piperaceae	

<b>Genus</b>	<i>Piper</i>	
<b>Distribution</b>	New Zealand.	Native in Indonesia. Widely cultivated in southern China, and Taiwan.
<b>Morphology</b>	Aromatic glab. shrub or tree up to 6m. tall; branches ± zigzag, jointed and swollen at nodes, dark. Leaves opp., with adnate stipules; rather abruptly narrowed to obtuse tip. Spikes unisexual, solitary or paired. Fls minute, sessile, very close-set; bract orbicular-peltate. Drupes very close-set.	
<b>Content</b>	The plant contains diyangambin, excelsin, epiexcelsin, demethoxyexcelsin, piperdardine, chingchengenamide A, dihydropiperlonguminine,	The plant contains β-sitosterol. The leaf contains evaporation oil, chavicol, ethers, alkenes, etc. It also contains many kinds of free amino acids, ascorbic acids, malic acid, oxalic acid, gluconic acid, glucose, maltose, glucuronic acid.
<b>Traditional use</b>	The plant used to treat cuts, traumas, gonorrhea, stomachache, toothache, stomachache, skin, kidney, eczema, bruises, rheumatism, trauma, parasitic diseases, bladder discomfort, toothache, urethral inflammation, kidney, intestine, diuretics and aphrodisiac.	The blossom has curative effects for coughing, wheezing and dyspnea, chest and abdominal cold pains, pain in the chest and abdomen due to parasitic diseases, stomach deficiency resulting in diarrhea, choleric vomiting; relieving alcoholism and reviving taste. The leaf has curative effects for cold cough, cold pain in the stomach, beriberi due to wind toxin, edema during pregnancy, eczema, scabies, ulceration, miasmatic toxin, etc.
<b>Biological activity</b>	The plant is used to bacterial inhibition.	It has antiseptic, parasite inhibitory, blood pressure lowering, central nervous system inhibitory, heart contraction and heart rate lowering effects <sup>[157-159]</sup> .



**Figure 35.** Dioecious perennial vines, woody when old, length reaching several meters; adventitious roots usually growing from nodes. Leaves alternate, slightly leathery, thick, ovate, cordate, widely ovate to orbicular, bilaterally asymmetric, above dark green, below light green. Flowers unisexual, achlamydeous (having no perianth), spike; ovary embedded in the pits of fleshy inflorescence axis, and fused together. Berries fused with floral axis to form fleshy fruiting spike, long cylindrical but bended, dark greenish brown when young, brown when matured.

**Table 36.** Distribution of *Metrosideros robusta* A. Cunn.

	<b>New Zealand(Maori)</b>	<b>Taiwan</b>
<b>Scientific name</b>	<i>Metrosideros robusta</i> A. Cunn.	<i>Eucalyptus citriodora</i> Hook.
<b>Vernacular name</b>	Rata, Northern Metrosideros	Lemon-scented spotted gum
<b>Family</b>	<i>Myrtaceae</i>	
<b>Genus</b>	<i>Metrosideros</i>	<i>Corymbia</i>
<b>Distribution</b>	New Zealand.	Cultivated in Fuchien, Kuangtung, Kuanghsi, Hainan, China, and Taiwan.
<b>Morphology</b>	Tree up to 25 m. or more tall; trunk up to 2 m. or more diam. Leaves coriac., on stout petioles. Inflorescences of many-flid, terminal cymes; petals about oblong; capsules oblong, distinctly exerted, loculicidally 3-valved.	
<b>Content</b>	The plant contains C-methyl flavonol and 5,7-dihydroxy-3,8,4'-trimethoxy-6-C-methylflavone <sup>[160]</sup> .	The leaves contain an evaporation oil, which is mainly composed of citronellal, citronellol, geraniol, gallic acid, ellagic acid, castalagin, citriodorin, p-menthanecis- 3,8-diol. The resin contains aromadendrin 7-monomethyl ether and kaempferol 7-monomethyl ether.
<b>Traditional use</b>	The nectar is used to treat sore throat. The bark is used to treat pain, bleeding, ringworm, colds, bruises, venereal diseases. The sap is used to stop bleeding, nourishing. The leaves are used to treat toothache.	The leaves can be used to expel cold and drain dampness, invigorate the stomach and ease pain, resolve toxins and cease itchiness. They can be used to treat common cold, wind dampness, ostealgia, stomach qi pains, indigestion, vomiting due to eruptive distention, dysentery, malaria, ulcerative furuncles, rubella, eczema, persistent tinea, burns from hot water and fire and bullet injuries.
<b>Biological activity</b>	The plants have antibacterial and antifungal activity.	The leaf evaporation oil shows anticancer activities in cancer inhibitory experiments <i>in vitro</i> and cancer implantation animal experiments. It can inhibit colon cancer.





**Figure 36.** Trees, to 25 m tall; bark grayish, smooth, exfoliating. Young leaves peltate, lanceolate, with glandular trichomes, base rounded; intermediate leaves widely lanceolate; mature leaves strongly smelling of lemon, narrowly lanceolate, slightly curved, base cuneate, both surfaces with black glands. Inflorescences axillary, paniculate. Flower buds narrowly obovoid. Capsules urceolate, valves included in calyx tube.

**Table 37.** Distribution of *Phebalium nudum* Hook. f. *Leionema nudum* (Hook.) Paul G. Wilson.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Phebalium nudum</i> Hook. f. <i>Leionema nudum</i> (Hook.) Paul G. Wilson	<i>Acronychia pedunculata</i> (L.) Miq.
<b>Vernacular name</b>	<i>Mairehau</i> , <i>Phebalium nudum</i>	<i>Acronychia</i>
<b>Family</b>	<i>Rutaceae</i>	
<b>Genus</b>	<i>Leionema</i>	<i>Acronychia</i>
<b>Distribution</b>	New Zealand.	Kuangtung, Hainan, Kuanghsi, Yunnan, and Taiwan.
<b>Morphology</b>	Glab. aromatic much-branched shrub up to ± 3 m. tall; branchlets slender, ascending; bark reddish. Leaves alt., on very short ± twisted petioles. Fls fragrant; sepals minute, pubescent, triangular; petals white, linear, apex inflexed.	
<b>Content</b>	The plant contains d-citronellal, geranial, neral, acetic, isovaleric, palmitic and cinnamic acids, isoeugenol, β-sitosterol, α-terpineol, dictamnine γ-fagarine, evolitrine, skimmianine, kokusaginine, 9-hydroxy-4-methoxyfurano(3,2-g)benzopyran-7-one, ellagic acid, phebalin and phebalarin.	The outer layer of the roots contain skimmianine, dictamine, kokusaginine, acronylin, acrovestone, bergapten and β-amyria. The heartwood contains evolitrine, β-sitosterol and acronycine. The stem peel contains bauerenol, potassium oxalate and acrovestone.
<b>Traditional use</b>	Used for perfume <sup>[161-163]</sup> .	The stem can be used to expel cold and ease pain, move qi and boost blood circulation, and soothe coughing. It can be used to treat rheumatic lumbago and leg pains, stomach pains, hernia pains, traumatic injuries, fevers from bronchitis.
<b>Biological activity</b>		It has obvious inhibitory and curative effects on liver cancers in mice.



**Figure 37.** Evergreen trees, 10~20 m tall. Young branch and inflorescences pubescent. Leaves simple, opposite, oblong, densely punctate. Cymes with long peduncles, axillary or terminal. Flowers bisexual; petals 4, pale green, narrowly lanceolate or linear, margin inrolled, densely tomentose inside. Drupes yellow, glabrous, semi-transparent; seeds black, with fleshy endosperm.

**Table 38.** Distribution of *Phormium tenax* J.R. Forst & G. Forst.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Phormium tenax</i> J.R. Forst & G. Forst	<i>Hemerocallis lilioasphodelus</i> L.
<b>Vernacular name</b>	<i>Harakeke</i> , New Zealand flax	Lemon lily
<b>Family</b>	<i>Xanthorrhoeaceae</i>	
<b>Genus</b>	<i>Phormium</i>	<i>Hemerocallis</i>
<b>Distribution</b>	Guatemala and New Zealand.	China and cultivated in Taiwan; also Japan, Korea, Mongolia, Russia.
<b>Morphology</b>	Leaves stiff and ± erect, at least in lower part; butt heavy and us. brightly coloured. Fls predominantly dull red; tips of inner tepals only slightly recurved. Ovary erect; carpels straight. Seeds ± elliptic, plate-like but ± twisted.	
<b>Content</b>	The plant contains acetic acid, furfural, aliphatic aldehydes, nor-isoprenoids, isocucurbitacin D, 3-epi-isocucurbitacin D and xylan.	The plant contains chrysophanol, hemerocal, 2-methoxyobtusifolin, obtusifolin, aloe-emodin, rhein and hemerocallin.

<b>Traditional use</b>	The branch is used to treat burns, wounds, sores, diarrhea. The root juice is used to treat constipation, injections, stab wounds. The boiled root juice is used to treat flatulence, trauma, amputation, frostbite, nourishing, menopause, constipation, upset stomach, parasite, bad breath. The root is used to treat colds, headaches, abscesses, swollen joints, ringworm, dermatitis. The leaves are to treat burns, wounds, cuts, constipation, rheumatism, sciatica, forest diseases, tumors, abscesses.	The roots clear heat, drains dampness, cool blood and stop bleeding, resolve toxin and reduce swelling. Hemerocallis lilioasphodelus can be used to treat jaundice, edema, strangury-turbidity, leucorrhea, epistaxis, blood in stool, flooding and spotting, mastitis, obstructed milk flow and shistosomes.
<b>Biological activity</b>	The plants have anthelmintic properties [164-167].	<i>In vitro</i> experiments have demonstrated that the root has certain inhibitory effects on Mycobacterium tuberculosis. The roots and ethanol effusions have curative effects on experimentally induced tuberculosis in mice. The roots inhibit shistosome infections.



**Figure 38.** Herbs, perennial. Tubers fusiform, short, fleshy. Leaves radical, distichous, broadly linear. Flowering stems stout. Inflorescences panicle. Flowers 6~12; perianth segments orange, connate basally; outer segments 3, oblong-lanceolate, 1~2 cm wide, veins parallel; inner segments 3, oblong, veins branched; Capsules oblong.

**Table 39.** Distribution of *Phyllocladus trichomanoides* D. Don.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Phyllocladus trichomanoides</i> D. Don	<i>Nageia nagi</i> (Thunb.) O. Kuntze
<b>Vernacular name</b>	Teteaweke, Celery pine	Broad-leaved podocarp
<b>Family</b>	Podocarpaceae	
<b>Genus</b>	<i>Phyllocladus</i>	<i>Nageia</i>
<b>Distribution</b>	New Zealand.	Chechiang, Chianghsi, Fuchien, Kuangtung, Kuanghsi, Ssuchuan of China and Taiwan.
<b>Morphology</b>	Monoec. tree up to 20 m., trunk up to 1 m. diam.; phylloclades alt., pinnately arranged on whorled rhachides up to 3 dm. long. Leaves of juveniles long, narrow-linear, deciduous; of adults much smaller. Phylloclades 10–15 per rhachis, irregularly and broadly rhomboid, flabellately lobed, cuneate at base; lobes obtuse to truncate, margins minutely crenulate.	
<b>Content</b>	The plant contains flavanocoumarins, flavanophenylpropanoids [169], catechin [169], luteolin and flavone O-glycosides [168-170].	The plant contains nagilactone, vomifoliol, methoxynagilactone, 3-deoxy-2a-hydroxynagilactone, 3-epinagilactone, totarol, podototarol, 16-carboxyltotarol, β-sitosterol.
<b>Traditional use</b>	The bark is used to treat dysentery.	The whole plant can cease bleeding and connect fractured bones.
<b>Biological activity</b>	The plants have antifungal activity.	



**Figure 39.** Evergreen dioecious tree, 20 m high; trunk broad conical; bark nearly smooth, reddish brown or dark purplish red, small thin pieces shedding off; branches spreading. Leaves decussate or nearly opposite, thick leathery, oblong-ovate, broadly lanceolate or narrowly elliptic, above dark green, beneath glossy, light green, many parallel fine veinlets. Seeds sphere, aril dark purple when matured, powdery, outer seed coat yellowish brown.

**Table 40.** Distribution of *Prunus persica* (L.) Batsch.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Prunus persica</i> (L.) Batsch	
<b>Vernacular name</b>	Pititi, Peach	
<b>Family</b>	Rosaceae	
<b>Genus</b>	<i>Prunus</i>	
<b>Distribution</b>	Hopei, Shanhsi, Shenhsi, Kansu, Shantung, Honan, Ssuchuan, and Yunnan, also cultivated in Taiwan and New Zealand.	
<b>Morphology</b>	Deciduous, small and spreading tree with rather open habit, up to 4–(6) m high when mature, not armed; trunk usually short. Lvs long, glabrous. Fls usually solitary, occasionally paired, not fragrant, on short lateral shoots. Hypanthium very broad; petals 5, erect to spreading, orbicular to broadly oblong, very shallowly emarginate, pale pink. Fr. globose, sulcate, tomentose, greenish yellow to red, often much more deeply coloured on side exposed to sun, succulent and sweet; stone deeply pitted and furrowed.	
<b>Content</b>	The seed kernel contains methylene, cycloartanol, citrostadienol. The kernel has inflammation dissipating and pain suppressing pharmacological effects, the oil contains unsaturated fatty acids; mainly oleic acid and linoleic acid.	
<b>Traditional use</b>	The plant is edible.	The fruit and leaves can be used to activate blood and dissipate stasis, moisten the intestine and purge excretion. It can be used to treat dysmenorrhea, amenorrhea due to static blood, postpartum stasis induced abdominal pain, clot, traumatic injuries, bloody phlegm and swelling pain, pulmonary abscess, intestinal abscess, and constipation due to intestinal dryness.
<b>Biological activity</b>	For the circulatory system, the kernel oil can reduce the resistance inside coronary blood vessels; it can also reduce coagulation and inhibit the formation of thromboses, resulting in the prolonging of coagulation time. The seed kernel aqueous extract has a quite strong inflammation dissipating effect. The aqueous extract can inhibit the generation of hemolytic factors in the blood serum. The alcoholic extract can restrain allergic reactions on the skin induced by auto-antibodies. The fatty acids can moisten the intestinal tract, which can enhance purgation. The kernel has cough suppressing effects. There has also been studies that have reported anti-bacterial activity against <i>Staphylococcus aureus</i> and <i>Listeria monocytogenes</i> <sup>[171,172]</sup> .	



**Figure 40.** Small deciduous trees, 3~8 m tall. Branchlets green or reddish brown on one side, glabrous. Leaves alternate, or fasciculate on short shoots, elliptic-lanceolate to obovatelanceolate, finely serrate, glabrous. Flower usually solitary, developing before leaves, with short pedicels; petals 5, obovate, pink or rarely white, obovate. Drupes nearly globose, short tomentose; flesh white or yellow, adnate to stone or not. Seed 1, compressed ovate to cordate.

**Table 41.** Distribution of *Rhopalostylis sapida* H. Wendl. & Drude.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Rhopalostylis sapida</i> H. Wendl. & Drude	<i>Areca catechu</i> L.
<b>Vernacular name</b>	Nikau	Betel nut
<b>Family</b>	Arecaceae	Arecaceae
<b>Genus</b>	<i>Rhopalostylis</i>	<i>Areca</i>
<b>Distribution</b>	New Zealand.	China (cultivated in Fuchien, Kuangtung, Hainan, Kuanghsi, Yunnan) and Taiwan; native to Malaysia.
<b>Morphology</b>	Trunk to c. 10 m. × 25 cm., green between rather closely spaced lf-scars; Ultimate branches of Inflorescences. at first pale cream-coloured; fl.-buds tightly packed, lilac. Fr. elliptic-oblong, brick-red. Seed long-oval, tightly invested in smooth, whitish endocarp which is marked by mainly longitudinal vascular strands.	
<b>Content</b>	The plant contains arabinose and galactose <sup>[173]</sup> .	The alkaloids of the seeds are mainly arecoline, arecaidin, guvacoline, guvacine, isoguvacine and arecolidine.
<b>Traditional use</b>	The plant is used to consolation and helps to relax muscles during childbirth.	The seeds can expel insects, resolve accumulation, direct qi downward, move water and stop malarial diseases. They are used to treat worm accumulations, food accumulation, distending pain of the abdomen, tenesmus, beriberi, edema and malaria.

<b>Biological activity</b>	The seeds expel worms. The aqueous effusion has antifungal effects on <i>Achorion schonleinii</i> and <i>Tricophyton violaceum</i> . <i>Areca catechu</i> has anti-influenza effects. The seeds have been reported to inhibit ACE and lower blood pressure. The polyphenolic compounds in <i>Areca catechu</i> have inhibitory effects on Ehrlich ascites carcinoma.
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**Figure 41.** Trees, 10~18 m tall. Stems ringed with conspicuous leaf scars. Leaves pinnate, clustered at apex of stem, glabrous, rachis recurved. Inflorescences borne below crownshaft. Flowers unisexual. Staminate flowers small, numerous, sessile, usually solitary, rarely opposite, on branches; petals 3, ovateoblong; pistillate flowers larger and fewer, sessile, at base of rachillae. Drupes ellipsoid or globose, petals persistent, red at maturity.

**Table 42.** Distribution of *Sophora microphylla* Aiton.

	New Zealand( Maori)	Taiwan
<b>Scientific name</b>	<i>Sophora microphylla</i> Aiton	
<b>Vernacular name</b>	<i>Kowhai</i> , Ku Shen	
<b>Family</b>	<i>Fabaceae</i>	
<b>Genus</b>	<i>Sophora</i>	
<b>Distribution</b>	Russia (Siberia), China, Korea, Japan, Taiwan and New Zealand.	
<b>Morphology</b>	Moderate to large tree up to 25 m high, with 1 main trunk or several prominent main branches; branches weeping, spreading and ascending. Divaricating and/or strongly flexuose juvenile branchlets present; branchlets often strongly interlaced, yellow-brown to orange-brown, glabrous to sparsely pubescent, becoming increasingly pubescent during the transition to adult branchlets; hairs appressed, straight. Seedlings and juveniles sparsely to moderately leafy, leaves with increasing numbers of leaflets. Corolla yellow; petals with distinct claws. Fruit 4-winged, brown, sparsely to moderately pubescent, with up to 12 seeds. Seeds oblong, elliptic to ± orbicular, yellow to light.	
<b>Content</b>	The plant contains phyllanone A, phyllanone B, isosoporanone, maackiain, medicagol and lupalbigenin <sup>[174]</sup> . The roots contains alkaloids and also xanthohumol.	
<b>Traditional use</b>	The plant is used to treat pain, skin disease, abrasions, fractures.	The root can be used to treat bloody dysentery due to heat toxins, bloody diarrhea, infantile pneumonia, red and white leucorrhea, jaundice, hemorrhoids, rectocele, dark and itching skin, scabies and malignant ulcers, wet and itching genital ulcers, scrofula and scalds. The root is used clinically to treat bacterial dysentery, acute gastro-intestinal enteritis, acute infectious hepatitis, infantile pneumonia, acute tonsillitis and chronic bronchitis.
<b>Biological activity</b>	The decoction of <i>sophora flavescens</i> have urine promoting and salt discharging effects. High concentration decoctions have inhibitory effects against TB and dermatophytes. The alcohol extract paste has antitrichomonal effects.	



**Figure 42.** Shrubs, 60~120 cm tall; roots cylindrical, with yellow bark. Stems pale green, with irregular longitudinal grooves, young stems with yellow hairs. Leaves imparipinnate, alternate, stipules linear. Flowers light yellow; corolla papilionaceous; standard petal longer, reflexed, apex round; wing and keel petals shorter. Pods linear, beaked; seeds 3~7, black, globose.

**Table 43.** Distribution of *Ulex europaeus* L.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Ulex europaeus</i> L.	<i>Acacia farnesiana</i> (L.) Willd.
<b>Vernacular name</b>	Koti, Gorse	Sweet
<b>Family</b>	<i>Fabaceae</i>	
<b>Genus</b>	<i>Ulex</i>	<i>Acacia</i>
<b>Distribution</b>	Argentina, Bolivia, Brazil, Canada, Caribbean, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, United States, Uruguay and New Zealand.	Chechiang, Fuchien, Kuangtung, Hainan, Kuangsi, Ssuchuan and Yunnan provinces, China, and Taiwan.
<b>Morphology</b>	Shrub up to 2 m high; main stems erect or spreading, densely branched in younger parts but eventually bare at base; young twigs and spines somewhat glaucous; hairs usually grey. Lvs of seedlings not spinous but with 3 hairy leaflets. Fls solitary; bracteoles acute to ± rounded, 1.5–3 mm wide. Corolla clear yellow or golden yellow, 13–20 mm long. Pod villous, turning dark brown to black; seeds smooth and rounded, brown or greenish brown, shiny, few per pod.	
<b>Content</b>	The plant contains flavonols, flavones, isoflavones, flavanones, quercetin glucosides, apigenin, glycitin, liquiritigenin, phenolic acids and saponins.	The bark contains catechutannin.
<b>Traditional use</b>		The branches can constrict, stop bleeding and relieve coughing. <i>Acacia farnesiana</i> can be used to treat seminal emissions, leucorrhea, rectocele, bleeding from wounds and chronic coughing and dyspnea.
<b>Biological activity</b>	The plants have antioxidant activities.	The plants have antioxidant and antimicrobial activities [175-177].



**Figure 43.** Erect shrubs or small trees, 2~4 m tall. Bark rough, brown, much branched; branches zigzag with small lenticels. Leaves bipinnate; leaf axis sulcate, whitish pilose, with glands. Flowers fragrant, 1, 2 or 3, clustered in axillary heads; peduncle bracteate, hairy; corolla tube-like, yellow, 5-toothed. Pods turgid, cylindrical, dark brown, surface obliquely striate. Seeds many, brown, ovoid, 6 mm long.

**Table 44.** Distribution of *Vitex lucens* Kirk.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Vitex lucens</i> Kirk	<i>Vitex quinata</i> (Lour.) F. N. Williams
<b>Vernacular name</b>	<i>Puriri</i> , New Zealand teak	Five-leaved chaste tree
<b>Family</b>	<i>Lamiaceae</i>	
<b>Genus</b>	<i>Vitex</i>	
<b>Distribution</b>	New Zealand.	China and Taiwan; also India, Japan, Malaysia, Philippines.
<b>Morphology</b>	Tree up to c. 20 m. tall; trunk up to c. 1.5 m. diam.; branches stout, spreading; branchlets 4-angled. Lvs opp., on petioles up to ± 10 cm. long. Domatia present at axils of costa and main veins. Infl. of ample (4)–10–15-fld, dichotomous, axillary panicles. Upper lip entire or bifid, lower deflexed, 3-lobed. Drupe subglobose, bright red.	
<b>Content</b>	The plant contains aucubin, agnuside, ecdysteroids, iridoids, apigenin, isovitexin, luteolin, orientin and Vitexin.	The plant contains β-sitosterol, vitexin, 20-hydroxyecdysone 20,22-monoacetone, 3,5-O-bicaffeoyl quinic acid, daucosterol, methyl 3,4,5-O-tricaffeoyl quinate.
<b>Traditional use</b>	Leaves - boiled, bath sprains and backache.	The roots and heartwood clear heat, suppress coughing and have calming activity. It is used to treat acute and chronic tracheitis and bronchitis, coughing and dyspnea and gastric diseases. The leaves expel cold, cleanse the lungs, move and activate the blood and stop bleeding. It is used to treat hematemesis, epistaxis, pharyngitis, acute hepatitis and jaundice hepatitis.

<b>Biological activity</b>	Vitexin is a flavonoid found in <i>V. lucens</i> . Studies have shown that it has anti-convulsant, anti-moral, anti-nociceptive, neuroprotector and cardioprotector effects. Recent study has shown that it also has anti-inflammatory effects by inhibiting neutrophil migration and pro-inflammatory mediators release. Research has shown the potential of vitexin to treating asthma through mechanisms of decreasing Th2 cytokines and allergen-induced IgE productions. This causes a decrease in mucus secretion, swelling of lung tissue as well as cell infiltrates.	3,4,5-O-tricaffeoyl quinate from the ethanol extract has an obvious cytotoxicity on human breast cancer cell line [178-185].
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**Figure 44.** Trees, odoriferous; heartwood yellowish brown. Young branches quadrangular, hairy. Leaves opposite, palmately compound. Inflorescences panicles, with grayish white hairs; bracts linear, caducous. Corolla yellowish white. Drupes globose or ovoid-globose, black at maturity.

**Table 45.** Distribution of *Asplenium bulbiferum* G. Forst.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Asplenium bulbiferum</i> G. Forst.	<i>Asplenium nidus</i> L.
<b>Vernacular name</b>	Pikopiko, Hen and chicken fern	Bird's nest fern
<b>Family</b>	<i>Aspleniaceae</i>	
<b>Genus</b>	<i>Asplenium</i>	
<b>Distribution</b>	Bhutan, China, India, Japan, Nepal, Vietnam and New Zealand.	Tropical region of Asia. From the Himalaya to southern China, Japan, South- East Asia and Taiwan.
<b>Morphology</b>	Ferns, Rhizome short, stout, erect. Pinnae 15-30 (or more) pairs, ovate to narrowly ovate, acuminate, shortly stalked, scaly on underside, basal pair pointing downwards when fresh. Sori numerous, broad, submarginal.	
<b>Content</b>	The plant contains 5-O-glucoside, kaempferol 3-O-arabinoside-7-O-rhamnoside, kaempferol 3-O-glucoside-7-O-rhamnoside, kaempferol 3,7-di-O-rhamnoside, quercetin 3-O-rhamnoside-7-O-arabinoside and quercetin 3-O-glucoside-7-rhamnoside, Flavonol 5-O-glycosides.	The plant contains globularin, gliricidin 7-O-hexoside, apigenin 7-O-glucoside, quercetin 7-O-rutinoside, keampferol 7-O-gentiobioside, quercetin 7-O-galactoside, myricetin 3-O-rhamnoside, keampferol-3-O-rutinoside, linoleic acid dimer, keampferol 3-O-rhamnoside, keampferol-7-O-rutinoside, quercetin, gliricidin 7-O-hexoside, quercetin-7-O-rutinoside, keampferol-3-O-rutinoside and myricetin-3-O-rhamnoside.
<b>Traditional use</b>	Used as an expectorant, anti-cough remedy, laxative, emmenagogue, abortifacient and for irregular menses.	The whole plant can strengthen muscles and joints; dissipate static blood; promote blood circulation; promote tissue regeneration; resolve toxin; subside swelling; relieve headache, impotence, strangury disease, pain due to bone fractures, and falling injuries. Fresh leaves can be ingested as vegetable.
<b>Biological activity</b>	The plants have antifungal activity.	The plants have anti-oxidant, anti-bacterial and anti-cancer activities [186-191].



**Figure 45.** Perennial weedy fern, 50~120 cm high; rootstock thick and short as tuber shape. Fonds tufted and borne in a rosette as a nest, broad lanceolate, coriaceous, Sori borne along vienlets on upper half of adaxial surface, long linear and densely distributed.

**Table 46.** Distribution of *Cheilanthes tenuifolia* (Burm.) Sw.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Cheilanthes tenuifolia</i> (Burm.) Sw.	<i>Cheilanthes chusana</i> Hook.
<b>Vernacular name</b>	Rock fern, Narrow-leaved lip fern	Cheilanthes
<b>Family</b>	<i>Pteridaceae</i>	
<b>Genus</b>	<i>Cheilanthes</i>	
<b>Distribution</b>	Australia, Cambodia, China, India, Laos, Malaysia, Nepal, Sri Lanka, Thailand, Vietnam and New Zealand.	Southern China, Sri Lanka, India, Philippines, and Taiwan.
<b>Morphology</b>	A small, terrestrial fern, up to 70 cm tall, with triangular, long-stalked leaves and marginal sori. Leaves many, densely tufted, dimorphous, the sterile ones usually much smaller than the fertile ones; petiole slender, lustrous dark brown, bearing scattered short brown hairs, densely scaly at base, sparsely and minutely scaly near apex, sulcate above; pinnae deltoid to ovate, inequilateral, more developed towards the base, Spores trilete, tetrahedral, with reticulate-echinate ornamentation, brown or nearly black.	
<b>Content</b>	The plant contains rutin and quercetin.	The plant contains phenolic compounds, steroids, alkaloids and terpenoids.
<b>Traditional use</b>	Used as a component of dye mixtures by the New Zealand Maori.	The whole plant can clear heat, resolve toxin, promote urination, stop bleeding, promote blood circulation, cease diarrhea and clear hepatic fire. It can relieve jaundice, hepatitis, acute pulmonary inflammation, wind fire, toothache, fever, sore throat, painful urination, dysentery, inflammatory swelling of unknown origin, and carbuncle. It is very effective for treating eye diseases.
<b>Biological activity</b>	Extract from this plant have shown to have properties such as anti-cancerous, anti-oxidatna and anti-bacterial. Quercetin has higher anti-cancer activities as well as scavenging potential [192-194].	The whole plant can lower blood pressure and restrain medicine induced swellings. It has mild inhibitory effects on G-bacteria.



**Figure 46.** Perennial herbaceous fern, 10~30 cm high; rhizome short, clothed with brownish scales. Fronds alternative and tufted with roots; stipes and rachis dark brown to black and polished; lamina bipinnately pinnatifid, lanceolate or oblong-ovate; pinna pinnatifid, alternative, the basal pinna opposite.

**Table 47.** Distribution of *Cyathea dealbata* (G. Forster) Swartz.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Cyathea dealbata</i> (G. Forster) Swartz	<i>Cyathea spinulosa</i> Wall. ex Hook.
<b>Vernacular name</b>	<i>Ponga</i> , Silver fern	Taiwan tree fern
<b>Family</b>	<i>Cyatheaceae</i>	
<b>Genus</b>	<i>Cyathea</i>	
<b>Distribution</b>	New Zealand.	Southern and southwestern China, Nepal, Burma (Myanmar), Thailand, Philippines, Ryukyus, Kyushu (Japan), and Taiwan.
<b>Morphology</b>	Rhizomes very rarely prostrate, usually erect, forming a woody trunk up to 12 m tall, 160–450 mm in diameter, covered in light brown or white projecting stipe bases; bearing scales near the apex. Rhizome scales marginate, acicular, lacking dark-coloured setae, chestnut-brown, shining. Stipes pale brown or whitish, tuberculate and slightly to moderately rough; Laminae adaxial surface dark green and slightly glossy; abaxial surface often green in young plants but becoming white or glaucous or occasionally grey- or blue-green in older plants.	
<b>Content</b>	The plant contains wax esters and lignin [195,196].	The plant contains alkaloids, flavonoids, phenols, amino acids, organic acids, and carbohydrates.
<b>Traditional use</b>	The plant is used to treat skin pain.	The whole plant is beneficial for clearing pulmonary and gastric fire, dispelling common cold, removing dampness, strengthening muscles and joints, stop bleeding, and detoxifying. It can be used to treat dyspnea with coughing, asthma, epidemic cold, toothache, internal injuries, abdominal pain, swelling in small intestine, osteodynia, lower back pain, rheumatoid arthritis, and falling injuries.



**Figure 47.** Perennial, large woody fern; stem massive, erect, unbranched, 5 m or more high; bark firm, darkish brown or black, with prominent sculpture like leaf scars. Fronds large, arranged in a terminal crown; above sparse, brown, wrinkled, and septate hairs along rachis, pinna rachis and costae, below sparsely tiny spines.

**Table 48.** Distribution of *Pteridium esculentum* (G. Forst.) Cockayne.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Pteridium esculentum</i> (G. Forst.) Cockayne	<i>Pteridium aquilinum</i> (L.) Kuhn subsp.
<b>Vernacular name</b>	Rarahu, Bracken fern	Bracken
<b>Family</b>	<i>Dennstaedtiaceae</i>	
<b>Genus</b>	<i>Pteridium</i>	
<b>Distribution</b>	Australia, Cambodia, China, India, Indonesia, Malaysia, Philippines, Thailand, Vietnam and New Zealand.	Widely distributed in China, Korea, Japan, Okinawa, USA, Europe and Taiwan.
<b>Morphology</b>	Rhizome stout, 5–15 mm. diam., much branched, subterranean; stipites distributed. Stipes rigid, dark brown, shining, hairy when young. Rhachis stout, brown, hairy when young, with distant opp. to subopp. pinnae. Broadly deltoid to broadly ovate-oblong, coriaceous, dark green, ± hairy below and on costae and costules; veins free, mostly forked. Pinnules with a few basal lobes to entire.	
<b>Content</b>	The plant contains (5S,6S,9S,10S)-15-hydroxycadina-3,11-dien-2-one, p-hydrox and p-hydroxystyrene β-vicianoside.	The plant contains l-idanone compounds, including pterosin A, pteroside A, palmitylpterostin A, isocrotonylpterostin, benzoylpterostin B and acetylpterostin C. It also contains pterolactam, ponasterone A, ponateroside A, (pterosterone), and pteritannic acid. Fresh leaf contains amygdalin glucoside, hydrocyanic acid, etc.
<b>Traditional use</b>	The plant is used to patient diet, seasickness, flu, severe burns, dysentery.	The root can clear heat, promote urination, replenish yin and nutrition. It can relieve high fever, sore throat, typhoid, eyestrain, jaundice, diarrhea, painful muscles and joints, carbuncle and swelling, eczema, rectocele and leucorrhoea. Tender leaf can clear heat, resolve phlegm, direct qi downward, and lubricate the intestines. It can also be used to treat constipation, prolapse of rectum, hemorrhoids, and ulcers.
<b>Biological activity</b>	The plants have antifungal activity.	<i>P. aquilinum</i> initially generates inflammation in the gastrointestinal submucosal, and later causes the numbness in the central nervous system. It has anti-microbial activity against certain bacteria both gram positive and negative including <i>B. subtilis</i> , <i>E. coli</i> . The pterolactam is considered to be a kind of carcinogen. <sup>[197-199]</sup> .



**Figure 48.** Perennial weedy fern; rhizome thick and creeping underground; sprouts gradually in spring, young bud circinate first then triforked; stipe erect, stout, firm, fibrous, brown or yellowish green, luster; vein forked, rachis hairy.



**Table 49.** Distribution of *Auricularia polytricha* (Mont.) Sacc.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Auricularia polytricha</i> (Mont.) Sacc.	
<b>Vernacular name</b>	Hakeka, Cloud ear fungus	
<b>Family</b>	Auriculariaceae	
<b>Genus</b>	<i>Auricularia</i>	
<b>Distribution</b>	Chiling, Mangolia, Hopei, Liaoning, Shanhsi, Honan, Shensi, Kansu, Chinghai, Ssuchuan, Anhuei, Chiangsu, Chechiang, Chiangsi, Yunnan, Kuangtung, Kuanghsi, Fuchien, New Zealand and Hainan of China, and Taiwan.	
<b>Morphology</b>	Fructifications tough cartilaginous-gelatinous, superior surface mouse grey to olive brown when fresh, inferior surface greyish brown. Superior surface pilose, covered with thick-walled, hyaline hairs, Internal hyphae hyaline, thin-walled, septate; medulla readily distinguishable, composed of hyphae arranged parallel to the surface. Hymenium inferior, composed of dikaryophyses and basidia; dikaryophyses slender, branched, forming a tough surface layer; basidia cylindrical-subclavate. Germination by germ tubes or by repetition <sup>[200]</sup> .	
<b>Content</b>	The carpophore contains lectin, and auritoxin I and II. It is a complex consisting of proteins and polysaccharides.	
<b>Traditional use</b>	An article of food, being boiled and mixed with bean curd and vermicelli; it is also administered as a medicine to purify the blood. Fresh specimens lose four-fifths of their weight when drying.	Moistening the lungs and ceasing coughs; ceasing bleeding; decreasing blood pressure; and anticancer. It is indicated for qi deficiency, fresh blood in stool and hemorrhoids, flooding and spotting, hypertension, retinal hemorrhage, cervical cancer, vaginal cancer and traumatic injury.
<b>Biological activity</b>	The plants have antioxidant and anti-inflammatory activity. The extract has hypoglycemic effects and antiproliferative effects of cancer cells <sup>[201-208]</sup> .	



**Figure 49.** Growing from rotten wood of broadleaved trees; fruiting body jelly; cup-shape at the early stage, gradually changing to ear-form or leaf-form, often with folded base; sessile or with short stalk; hymenium beneath, reddish brown, purplish brown or purplish dark gray; sterile surface bluish brown, light brown to reddish brown, with dense and transparent trichomes.

**Table 50.** Distribution of *Usnea florida* (L.) Weber ex F.H. Wigg.

	New Zealand (Maori)	Taiwan
<b>Scientific name</b>	<i>Usnea florida</i> (L.) Weber ex F.H. Wigg.	<i>Usnea longissima</i> Ach.
<b>Vernacular name</b>	Angeange, Florida beard lichen	Beard lichen
<b>Family</b>	Parmeliaceae	
<b>Genus</b>	<i>Usnea</i>	
<b>Distribution</b>	United States and New Zealand.	Widely distributed in East Asia, including China, Korea, Japan, and Taiwan.
<b>Morphology</b>	Thallus: shrubby to subpendant; branching: both isotomic and anisotomic-dichotomous, divergent; branches: tapered, lateral branches not constricted at attachment point; annulations: numerous and conspicuous with white rings of medullary tissue; segments: terete and cylindrical; papillae: verrucous to cylindrical, usually numerous and irregularly to densely disposed on main and secondary branches; tubercles: usually present and numerous, often eroded and white at their top, mainly on terminal branches bearing apothecia; cortex: thick (9-12%) dull; medulla: thin and compact, unpigmented; axis: at least twice as much larger than the medulla.	
<b>Content</b>	The plant contains $\beta$ -orcinol depsidones, salazinic, norstictic acids and lecanoric acid.	U. longissima contain barbatic acid, usnic acid, and diffractaic acid. In addition, it also contains ramalic acid and lichenin.
<b>Traditional use</b>		Lung-clearing; dispelling phlegm; ceasing bleeding; detoxifying. Relieving headache, eye pains, coughing, malaria, carbuncle and swelling, leucorrhoea, flooding and spotting in blood heat pattern, traumatic bleeding, and insect bite.

<b>Biological activity</b>	The plants have antioxidant and antimicrobial activities. The <i>Usnea barbata</i> extracts has an inhibitory effect on PGE2 synthesis. The study has shown possible protection against ultraviolet light by inhibiting COX2.	Among these contents, usnic acid has the strongest antibiotic function, and demonstrates strong anti-inflammatory activities toward <i>Streptococcus pneumoniae</i> , <i>S. hemolyticus</i> , <i>Corynebacterium diphtheriae</i> , and <i>Mycobacterium tuberculosis in vitro</i> . When it is combined with streptomycin, it shows good therapeutic effects for pulmonary tuberculosis. Together with penicillin, it can effectively treat inflammation caused by <i>Clostridium tetani</i> . The toxicity of usnic acid and sodium in large dosages can damage the heart and the liver, leading to the decrease of heart rate and drop in blood pressure. <sup>[209-214]</sup> .
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**Figure 50.** Typical filamentous fruticose lichen; pendent epiphyte on plants; length varies with different hosts; repeatedly bi-forked or irregularly branched, gradually narrow toward the end; with or without soredia and isidia; with septate nodes; white margin; cortical at peripheral; cartilaginous axis at central. Reproductive organs (apothecium) disk shape, peripherally distributed with 1~3 mm diameter; disc-plate chestnut color; spores ellipsoidal; abundant and grows all year long.

## RESULTS

This study reviewed the most common plants used in Maori, thereafter comparing it to similar plants in Taiwan. This study finds 17 plants among the 50 to be of the same species, 19 of the same genus, and 14 of the same family. The plants are described by their morphology, content, traditional uses and biological activity. They have been categorized into cultivated greens (including herbs, weeds and roots), shrubs and/or trees, ferns and fungi.

## DISCUSSION

Even though it is believed that Maori originated from Taiwan, there is still visible difference between the plantations of the two islands. When comparing traditional use of the herbal plants to their scientific biological activity, there are also noticeable differences. Descriptions of traditional uses were often found to be vague, with no specific mechanism of actions recorded in comparison to the biological activity. Traditional usages are often transferred via word of mouth from one generation to the next, which can possibly explain the wide variation of usages for the similar plant. These variations could also be due to the different climates and geographic environment. Even though plants may be classified similarly, variations were noted in their morphology as well as documented traditional uses. This article is the first of its kind to compare herbal plants found in Maori to that of Taiwan, with the theory that Maori originated there from. The summarized tables can be provided to tohunga (experts of Rongoa Maori, medicinal plants and herbs) as a guide. The morphology can aid in identifying the right plants, with traditional use and biological activity to guide future treatments.

## CONCLUSION AND LIMITATIONS

Limitations were met by having to rely on published resources such as research articles and books. Rongoa Maori is passed down by word of mouth from the tohunga (experts) or even the kaumatua (elders) with little recordings. Valuable knowledge is lost as the newer generation has inclinations to move to the cities, leaving no one fit to inherit the rich cultural background and knowledge. Due to environmental changes, indigenous plantations are replaced by agriculture and deforestation. As a result of all these challenges, it is now even more crucial to provide scientific evidence of the Rongoa Maori plantations so that it can compete with the scientifically inclined modern society. This ethnobotany research adds new outlooks on indigenous plants to the current body of knowledge about the use of these herbal plants. In conclusion, even though there are similarities between the herbal plants in Maori and Taiwan, they have different usages.

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