IPHA Health-Promoting Plants Series

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Microseris walteri Gand. (prev. *M. lanceolata* (Walp.) Sch.Bip.)

Family: Asteraceae Tribe: Cichorioideae (Syn. Lactuceae)

Microseris – from the Greek words "micros," meaning small, and "seris," a term used by Pliny for a chicory-like plant.
walteri – probably named for C. Walter, a plant collector.

Common names

Murnong, myrnong, yam daisy, native dandelion

Image from *Flora of Australia*

Description

Microseris walteri is a perennial herb with a basal rosette, and white tuberous root. Usually only one root is produced at a time. Leaves are glabrous, narrow lanceolate, 5-25mm long x 2-10mm wide, sparsely toothed with a prominent midvein. All leaves are basal.

In spring, flower heads develop on smooth, unbranched peduncles up to 50cm long, which have a distinctive nod while the flower head is in the bud stage. Mature flower heads bear yellow ray florets, to 25 mm long. Tubular florets are absent. Flower heads typically die back after one day. The fruit is a ribbed achene, 8–10 mm long, terminating in a straw-coloured bristly pappus. The aerial parts die back during the summer, to emerge following the first autumn rains.

Murnong bears a superficial resemblance to other Asteraceae plants, including the introduced dandelion (*Taraxacum officinale*) and cat's ear (*Hypochaeris* spp.), however it can be readily distinguished by the very narrow leaves and the nodding peduncle.

Murnong fruit – photo by Andrew Pengelly

Murnong tubers – Wikimedia Commons

Distribution

Murnong is a native of open plains and grassy box woodlands of southern states including Tasmania; it has been historically reported in the south of Queensland, where it may be now considered extinct.
https://avh.ala.org.au/occurrences/search?taxa=Microseris+lanceolata#tab_mapView

Ecology of Microseris

The *Microseris* genus has four morphologically distinct ecotypes in Australia, that came about through a process of adaptive radiation. They are known generally as A "alpine", M "murnong", F "fine pappus" and C "coastal" (Vivenberg at al., 2000, Vivenberg, 2001). Of these ecotypes, *M. walteri* contains only the A and M types, while the M (murnong) type is the once widespread ecotype with the highly edible tuber. Historical records indicate that this widespread food source was almost eliminated in the early years of white settlement, due to the grazing and trampling of livestock, mainly sheep (Gott, 2008).

The A type, found only in the alpine regions, has a thin, fibrous tuber, and it propagates itself by vegetative means only. While both *M. walteri* ecotypes are found in Tasmania, the plants tend to be much smaller and less widespread, with limited evidence of prehistoric Aboriginal use (Macphail & Woodward, 2017).

As noted above, murnong goes dormant during the hot, dry summers of southern Australia, hence it isn't adapted to the wet summers and dry winters of northern Australia (Gott, 1983). It is however well adapted to fire, being one of the first plants to emerge after a bushfire. Along with the act of digging for harvesting purposes, management of the grassy plains and woodland by cultural burning is believed to have promoted and expanded the growth of murnong in central and western Victoria (Gott, 1992). Traditionally murnong habitat was subject to patch burning in late summer at intervals of approximately 3-5 years. This burning, both in dry sclerophyll woodlands and grasslands, ensured the maintenance of open sites for the growth of all the herbaceous perennial food plants, and edible root plants in particular (Gott, 2008; Cahir, Clarke & Clarke, 2018).

Other species

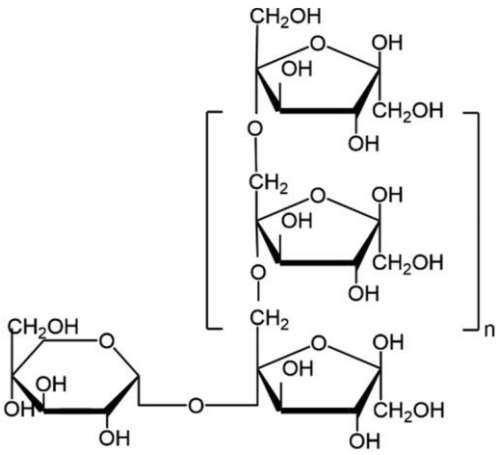
There has been much confusion with respect to the classification of *Microseris* species in Australia. It is generally agreed that there are three species, *M. lanceolata, M. scapiegera* and *M. walteri*. At various stages each of these names have been allotted to the murnong. The currently accepted classification is based on the 2016 paper by Neville Walsh of the Royal Botanic Gardens of Victoria (Walsh, 2018), in which he attributes *M. walteri* as the species bearing edible tubers, equivalent to the "M" ecotype referred to above. Other species may have limited use as a food source, but they have rarely been exploited for this purpose.

Edibility

"The fleshy tuber of the yam daisy has perhaps the most potential of any Australian bushfood" (Smith & Smith, 1999). The tubers of murnong were once a very common, if not staple, food of Aboriginal people in Victoria, and to a lesser extent in South Australia and New South Wales (Gott, 1983). The tubers can be eaten cooked or raw, the raw tubers having a bland and slightly bitter taste. Cooking methods include boiled, steamed, roasted or stir-fried, and baked in earth ovens (Smith & Smith, 1999; Morrison et al, 2022). The leaves are also edible, however they are rather bittier – similar to dandelion leaves.

Nutrients

As for most tuberous food sources, the key nutrient found in murnong is carbohydrate, mainly in the form of the fructose-based polymer, inulin. According to data collected by Jenny Brand and co-workers, 100g of edible portion of murnong fresh root provides 1.5g protein, 0.7g fat and 13.3g carbohydrate, mainly inulin (Gott, 2008). By contrast more recent analysis of fresh murnong root provided 3.05g protein, 0.39g fat, 3.35g carbohydrate and 3.28g fibre (Campanelli et al., 2018). While protein levels were higher in the later analysis, carbohydrate content was lower. Using a crude measure of carbohydrate, there is a significant difference in kilojoule energy (264:150) between the first and second analysis. Since the carbohydrate measured is mainly in the form of inulin, the actual amount of energy provided will be lower than these figures indicate. Unlike starch, inulin cannot be hydrolysed by digestive enzymes, rather it is selectively fermented by gut bacteria (Pengelly, 2021). Hence the amount of energy derived from ingestion of inulin is dependent on several factors, including the state of gut health.

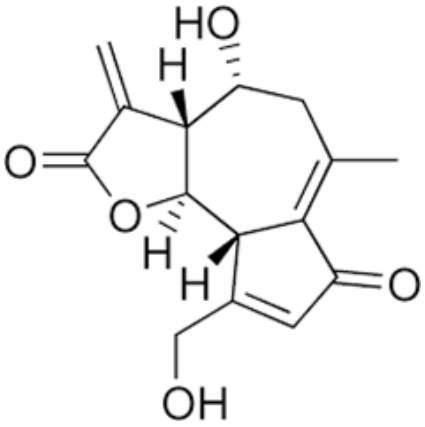


Inulin molecule structure

Inulin is found in the roots and tubers of many other plants, most notably within the Asteraceae family with examples such as chicory (*Cichorium intybus*) and Jerusalem artichoke (*Helianthus tuberosus*). It is responsible for several well-documented health-promoting effects in humans, to be reviewed below.

Phytochemistry

Very little has been documented regarding phytochemistry of the *Microseris* genus. It is possible to extrapolate from analytical studies of closely related genera within the Cichorieae (syn. Lactuceae) tribe within the Asteraceae family. For example, in a chemical review by Gonzalez, the most prevalent constituents were sterols, flavonoids, carotenoids, fatty acids and polyacetylenes (Gonzalez, 1977). Surprisingly this review makes no mention of sesquiterpene lactones, the large phytochemical group which is mainly associated with the Asteraceae family. However, in a more recent review, Zidorn (2008) does emphasize this group, noting that costus lactone type guaianolides and lactucin derivatives are the most widely reported sesquiterpenoids within the Cichorieae.



Lactucin, a guaianolide class of sesquiterpene lactones (Image from Wikepedia).

Therapeutic benefits of sesquiterpene lactones include anti-inflammatory, antimicrobial and anti-protozoal actions, while also acting as digestive bitters (Pengelly, 2021).

Medicinal Uses

While there is scant evidence of direct medicinal uses for murnong, there is evidence that regular consumption of inulin-containing foods provides preventative medicine against chronic illnesses, particularly diabetes mellitus. Mature onset diabetes (T2DM) is a major problem amongst Aboriginal communities, and it is estimated that the incidence for Aboriginal people living a westernized lifestyle including diet is up to 10 times higher than for European Australians (O'Dea, 1992). Other health diseases associated with western diets and lifestyle include coronary heart disease, hypertension and obesity. In a study published in the journal "*Diabetes*", the major metabolic abnormalities of T2DM were either greatly improved or completely normalized in a north-western Aboriginal community following a return to a more traditional diet (in which inulin replaced starch as the dominant carbohydrate) and lifestyle (O'Dea, 1984, 1992).

Apart from the potential effects of other nutrients and phytochemicals in murnong, inulin alone provides many therapeutic benefits. Through modulation of the gut microbiota and promoting beneficial microflora such as *Bifidobacterium*, numerous studies have demonstrated improved glucose metabolism, lower insulin levels, and beneficial effects on inflammation and immune function associated with inulin-rich diets (Alonso-Allende, Milagro & Aranaz, 2024).

Cultivation

Murnong is easy to cultivate. While it will grow in most well-drained soil types, bigger tubers are produced in more fertile soils. The species is well-adapted to the climate typified by the southern hot dry summers, in that the tops die back during summer, but the perennial tubers survive and shoot again when the autumn rains arrive. Cultivation in northern states such as Queensland is more problematic. In the author's experience the plants may not die back at all, while those that do die back may not resprout in the autumn. This could be the result of over-watering, causing the tuber to rot.

Propagation is the easiest part, as copious seed is produced over many months, and high strike rates are the norm, provided seeds are planted in the winter or spring. No special treatment is necessary. Seeds can be sown in a regular propagation mix or straight (coarse) sand and covered with a thin sand layer. Seedlings should appear within 2-3 weeks. Tubers harvested in autumn can also be separated and replanted.

Seedlings should be hardened off before planting out, plants being spaced 60cm apart (Smith & Smith, 1999). Murnong can thrive in sunny or semi-shaded environments. Sites with relatively infertile soils will benefit from applications of fertilisers or compost, with lime added to acid soil types. Pathogens are rare, however the peduncles holding the flower heads are susceptible to aphid and white fly attack in the greenhouse. In the field, the green leaves attract herbivores such as rabbits and wallabies, so fencing or other control methods will be required.

Agroecology

Murnong was traditionally a staple food with significant cultural and socio-economic values in Victoria, prior to white settlement. The ancestral practice of harvesting with digging sticks and cooking in earth ovens was a social practice that involved the participation of all the community, and Indigenous women in particular (Mora et al., 2020; Morrison et al., 2020). When the fields of yam daisies and other root crops were decimated via European introduction of sheep and other livestock, a major pillar of food sovereignty was lost, perhaps forever.

In recent years, experimental archaeologists have engendered a renaissance of ancestral cooking techniques focused on earth ovens and murnong. Experiments have shown that temperatures of more than 600°C can be achieved, while analysis of the nutritional content of the cooked tubers revealed little or no loss of nutrients in the process (Campanelli et al., 2018). Today traditional earth-oven cooking is celebrated by communal gatherings, the sharing of the cooked murnong helping in reconnecting people to country (Mora et al., 2020).

There is also a resurgence of interest in cultivating murnong, either on farms or by environmental groups, as a way of restoring ecosystems, particularly in the Victorian grasslands and mallee regions (Smallbone, Prober & Lunt, 2008; Bainbridge, 2017). Clearly *Microseris walteri* is an excellent choice for agroecology in the southern states, and worthy of experimentation in more northerly locations.

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