

## Sessile joyweed (*Alternanthera sessilis*): a popular leafy vegetable in South East Asia but federal noxious weed in USA

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**Summary** Sessile joyweed (*Alternanthera sessilis*) is a widely distributed perennial plant throughout the tropics and subtropics. It can grow on a variety of soil types. This plant is a popular leafy vegetable and is used as a folk medicinal plant in South East Asia. However, it has been declared a federal noxious weed in the USA due to its invasive characteristics. In the past, Sri Lankan community members living in Australia grew alligator weed (*A. philoxeroides*) as a leafy vegetable that they mistakenly identified as 'mukunuwenna' (sessile joyweed) because of its resemblance to the widely consumed leafy vegetable. To avoid using alligator weed as a mukunuwenna in Australia, the Victorian Department of Primary Industries promoted an Australian native plant, lesser joyweed (*A. denticulata*), as an alternative vegetable.

**Keywords** Sessile joyweed, Sri Lankan community, mukunuwenna.

### INTRODUCTION

*Alternanthera sessilis* (L.) R.Br. ex DC. known as sessile joyweed, dwarf copper leaf or mukunuwenna (the Sri Lankan common name) is native to Brazil and is a common plant in many tropical and subtropical regions throughout the world. This perennial plant prefers wet conditions but occurs in both wetlands and uplands and can grow under a variety of soil conditions. The plant is an erect, more or less branched, glabrous, succulent herb that grows up to 1 m tall. Leaves are extremely variable in shape and size, linear lanceolate to oblong, oval or obvate-spathulate, usually about 1–10 cm long, thick and succulent. Flowers are white, ovate to lanceolate and sessile. Seeds are lenticular, ovate in outline, 0.9–1.5 mm long and 0.8–1 mm wide, 0.3–0.6 mm thick with a marginal hilar notch at the broad end. The hilum is small and inconspicuous. The plant spreads by seeds which are wind and water dispersed and by rooting at stem nodes. The seeds are light sensitive. The average number of seeds produced per plant each season is 1,997.

**Beneficial properties of *A. sessilis*** This plant has some beneficial characteristics. *A. sessilis* is a Sri Lankan staple food. It is considered a leafy vegetable although it looks more like a herb (such as parsley)

than well known leafy vegetables (such as spinach or cabbage).

Commonly called 'mukunuwenna' it is the most widely produced and most popular of nine leafy vegetables cultivated and sold on a commercial scale in Sri Lanka (De Alwis *et al.* 2006). It is easy and inexpensive to cultivate, damage during transport is minimal and once cultivated it can be harvested on a monthly basis for about two years. Sri Lankans believe that this vegetable contains high levels of vitamins, protein and fibre, and consume the plant several times per week (Gunasekera and Adair 1999). The plants are shredded finely and stir fried with grated coconut and spices, to be eaten with rice.

In many places of the world, other than Sri Lanka, the leaves and stems of *A. sessilis* are eaten as a cooked vegetable. In tropical Africa its use as a vegetable has been reported from Guinea, Benin (in sauces and soup), Nigeria (in soup), Congo, Tanzania and Zambia (as a relish) as well as from Madagascar and Reunion (as a pot herb).

*Alternanthera sessilis* is used for simple stomach disorders, diarrhoea and dysentery, and as a plaster for diseased or wounded skin. In Nigeria the pounded plant is used for headache and vertigo. In Senegal and India leafy twigs, ground to a powder, are applied for snakebite. *A. sessilis* is a popular folk medicine in Taiwan, often in mixtures with other medicinal plants to treat hepatitis, tight chest, bronchitis, asthma and other lung problems (Lin *et al.* 1994). In Thailand and Sri Lanka, it is used as a galactagogue (a substance that induces lactation).

**Problems of *A. sessilis*** This plant prefers damp, shady areas, swamps, pond margins, shallow ditches, road sides, low lying waste places, damp pastures and cultivated areas. However, the species can tolerate extremely dry conditions. It often grows with some other aquatic species (Holm *et al.* 1997).

*Alternanthera sessilis* is a weed of rice and other crops, including sugarcane and bananas throughout the tropics. It is widespread in tropical Africa, Southern Asia to Japan, Pacific Islands, New Zealand, West Indies, Central America, South America and the United States. *A. sessilis* is not considered as a weed

in Australia yet. There has been no risk assessment or CLIMEX model done on this species.

**Alternanthera species in Victoria** From the 1960s most Sri Lankan expatriates living in Melbourne had their own patch of home grown 'mukunuwenna' (they assumed). The plant attained such a rarity value and status in Melbourne that it was regularly offered to friends and relatives in other states and territories in Australia. However, the Department of Primary Industries became aware that the Sri Lankan community had been mistakenly using the wrong plant as mukunuwenna. They were growing highly invasive alligator weed (*A. philoxeroides*). The confusion between alligator weed and the traditional Asian vegetable was a serious case of mistaken identity.

Alligator weed is a declared State Prohibited Weed in Victoria. When this problem was recognised the Department of Primary Industries initiated a program to control the weed throughout the State. Identifying a replacement vegetable for alligator weed was an important part of the program to encourage the Sri Lankan community to participate in the control effort.

#### MATERIALS AND METHODS

The Department decided not to promote real mukunuwenna (*A. sessilis*), grown in Sri Lanka as a replacement plant, due to its weedy nature in other countries. An Australian native species, of the same genus as mukunuwenna and alligator weed, commonly known as lesser joyweed (*A. denticulata*) was selected as a more environmentally suitable alternative. Both species (*A. denticulata* and *A. sessilis*) were grown in a glasshouse trail at DPI Frankston. There were four replicates of each species analysed. After one month, shoots were harvested and dried in an oven for five days at 65°C. Dried samples were analysed for chemical composition by the State Chemistry Laboratory at Werribee in Victoria.

#### RESULTS AND DISCUSSION

Results of the chemical analysis of both species are given in Table 1. *A. sessilis* showed slightly higher protein, fat and fibre content than *A. denticulata*. Nadkarni and Chaphekar (1977) reported that *A. sessilis* could accumulate aluminium in concentrations up to 10 times more than other plants in the same area. They found that it has the capacity to absorb and store large amounts of elements which were not taken up by other plants in the same environment. The analysis indicated that all elements in *A. sessilis* were higher than *A. denticulata* except phosphorus and iron.

*Alternanthera sessilis* is a declared federal noxious weed in USA. It is a major aquatic weed in irrigation

**Table 1.** Chemical composition of *A. sessilis* and *A. denticulata*.

Content	<i>A. sessilis</i>	<i>A. denticulata</i>
Protein %	16.0	12.0
Fat %	3.2	2.2
Fibre %	13.4	11.7
Calcium %	0.57	0.38
Phosphorus %	0.50	0.54
Magnesium %	0.64	0.29
Potassium %	4.3	3.7
Sodium %	0.11	0.07
Oxalic acid %	4.7	3.2
Iron mg kg <sup>-1</sup>	110	120
Copper mg kg <sup>-1</sup>	25	15
Lead mg kg <sup>-1</sup>	0.3	0.2
Cadmium mg kg <sup>-1</sup>	0.21	0.08

canals in Malaysia and a troublesome plant in rice fields in India and several African countries.

Observations over the last 10 years indicate that *A. sessilis* was present in some backyards in Victoria, NSW, Queensland and NT. Alerting members of the public to the dangers posed by this plant was a good preventative measure to avoid another backyard threat to the environment in Australia.

*Alternanthera denticulata* can confidently be promoted as an alternative for other *Alternanthera* species.

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