

SALTBUSHES AND GOOSEFOOTS

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The diverse and intriguing common names of saltbushes, bluebushes, crumble weeds, beetroot, quinoa and sugar beet provide motivation enough to explore the attributes of the 100 odd genera and 1500 species making up the goosefoot family. Characteristic of most family members are their goose-foot shaped leaves. This feature was the reasoning behind the family name of Chenopodiaceae, derived from the Greek words for goose and foot.

Many well-known saltbushes and bluebushes have superior drought and salt tolerance, such as the small, water-friendly, Rambler called climbing saltbush *Einadia nutans* and the woolly short-leaf bluebush *Maireana brevifolia*. Unfortunately, however, the chenopod family contains many invasive weeds, including fat-hen *Chenopodium album*. On the positive side, sugar beet *Beta vulgaris altissima* is a key source of the world's sugar supplies, whilst beetroot *Beta vulgaris vulgaris*, English spinach *Spinacia oleracea* and quinoa *Chenopodium quinoa* are valued by various societies as traditional staple foods. The family also contributes to the flower-garden through the spectacular crimson-leaved ornamental bluebush *Kochia scoparia trichophylla*, whilst many medicinal and herbal remedies are extracted from the family's herbs, such as crested goosefoot *Chenopodium cristatum* (poultices heal skin infections) and pigweed *C. album* (leaves chewed for toothache).

Chenopods are a gardeners' ideal plant

Most of the 300 Australian herbaceous or shrubby species (15 Tasmanian species) are halophytes, flourishing in saline locations within saltmarshes or in arid plant communities. These tough survivors are some of the most drought-tolerant garden plants available and once established thrive on neglect. A word of warning however: their palatable leaves should be permanently protected from browsing rabbits, potoroos, wallabies etc, whilst their wind-borne pollen has a reputation as one of the main summer allergy inducers. Recent research indicates that the goosefoots, along with that of the non-chenopods plantain, ragwort, asthma weed and Paterson's curse, are the key pollen allergy culprits.

To survive their harsh environments, plants such as grey saltbush *Atriplex cinerea* are adorned with tiny moisture-laden hairs. These collapse, excreting their contents onto the leaves. This forms a satiny grey coating of salt crystals and waxy particles. Other species possess small succulent leaves, whilst still others have the leaves replaced by green bladder-like jointed stems. Typical examples of the latter are the saltmarsh plants shrubby glasswort *Sclerostegia arbuscula* and the sprawling mat-like wallaby saltbush *Threlkeldia diffusa*.

For the wildfire-susceptible rural fringe properties, chenopods can be grown with a range of succulents to form a natural fire-break. They retard fire with the aid of saline moisture accumulated in their fleshy foliage. Ground covers and scramblers such as coastal saltbush *Rhagodia candolleana* and climbing saltbush grown over an upright mesh can form a useful fire barrier. The latter species are also excellent for erosion control, but be aware that under certain conditions, for example in some coastal revegetation projects, they should be classed as ‘over-successful natives’. To restrict their invasive potential they may need to be drastically pruned twice a year.

Glassworts form the saltmarsh’s framework

Glassworts (sometimes called samphires), such as beaded glasswort *Sarcocornia quinqueflora* and thick-headed glasswort *S. blackiana*, function as ‘framework’ species within the much-undervalued saltmarshes. Harris and Kitchener (2005) describe Tasmanian saltmarshes in detail, while Kirkpatrick and Glasby (1981) provide information on the nature and whereabouts of these communities in Tasmania, which are typically located adjacent to the sporadically inundated high tide levels of intertidal mudflats. Glassworts have adapted to survive periods of inundation by concentrating the saline water into their bladder-like stems, turning them pink then red. When the red colouration deepens, their stems drop, relieving the plant of its salty burden.

Glassworts are also key plants in the saltmarsh food web. They sustain the diverse populations of arthropods and molluscs that are harvested by the long prying beaks of the many waders such as oystercatchers, red-necked stints and hooded plovers. For example, the Lauderdale saltmarsh (Ralph’s Bay) and the Ramsar-listed Pittwater saltmarsh both have extensive glasswort communities supporting key migratory wader habitats. Many glasswort-dominated communities have been subjected to a long history of degradation through landfill, urban development and extensive grazing. However, their roles and values are now more appreciated, and many areas now receive formal reservation and/or recognition via Ramsar or other international agreements.

Mutual benefits for rare birds, moths and butterflies

Beaded and thick-headed glassworts and fleshy seablite *Suaeda australis* all provide a crucial food source for the endangered orange-bellied parrot *Nephelea chrysogaster*. During winter the birds can be observed feasting on these fleshy leaves at sites on the central Victorian coast, while on migration to or from their southwestern Tasmanian breeding grounds they also utilise this habitat along the northwestern Tasmanian coast and on the western Bass Strait islands.

Saltmarsh looper moth *Dasybela achroa* is another saltmarsh rarity, and one that is entirely confined to Tasmania. Indeed, it has only ever been found around Lauderdale, giving the local saltmarshes there particular conservation significance. However, nobody has yet figured out what its larvae feed on, but a saltmarsh plant of some sort seems likely. In contrast, the local larval foodplant of the attractive and more widespread chequered blue butterfly *Theclinestes serpentata* is known to be coastal saltbush. Adults lay their flattened pale green eggs singly on the flower heads. On hatching, the larvae munch voraciously on the succulent leaves. By mimicking the leaf colour and texture, they remain protected from bird predation.

People's plants

Food - It is not surprising that the Aborigines and European colonists enjoyed a variety of bush tucker treats supplied by the local chenopods. After all, in the Andes during the Inca period vast armies were sustained on quinoa. Known to the Incas as the 'mothergrain', quinoa has proven nutritionally far superior to all cereals and milk. It contains up to 18% complete protein and has an ideal blend of poly- and mono-saturated fats. Although available today in health-food shops, users often forget to pre-rinse the bitter saponins out of the grain prior to cooking.

Once the early European colonists had realised that native plants eaten by Aborigines were safe for them to try, chenopods became a very popular bush tucker. They require boiling to remove their saltiness before savouring as delicious greens. Commonly eaten were marsh saltbush *Atriplex paludosa* and climbing saltbush, whilst fleshy seablite gained a reputation as a pickle. Scurvy was avoided by early mariners by eating cooked bearded glassworts. Interestingly, recent irrigation trials in South Africa using saline water have opened up a potential green food supply, with excellent growth rates being achieved from bearded glasswort crops. A word of caution: as a green vegetable, these plants should be enjoyed in moderation. Like their spinach relative, they contain oxalates, which may cause digestive discomfort. However, the toxicity of oxalates is diminished by boiling and/or by serving them with foods rich in calcium. Delicious creamy sauces or

spinach kirsches are ideal options. The seeds of grey saltbush, like many of the chenopods, were once valued for grinding into a meal for baking as flat bread.

Medicinal herbs - The glycoside saponin is an active ingredient in spinach and other chenopods and aids the digestion by improving the absorption of minerals such as calcium, thereby correcting nutrient deficiencies. Chenopods cooked as greens also have a mild laxative effect, whilst providing a good source of vitamins A and C. The crushed leaves of fat-hen have proven valuable in poultices applied to burns, swellings and wounds. They can also be chewed uncooked to relieve toothache, whilst medicinal teas have gained a reputation for healing mouth ulcers. Wormseed oil extracted from *C. ambrosioides* is considered one of the most toxic of all essential oils. It was used as an anthelmintic (intestinal worm killer), but its toxicity has limited this application.

Soaps - A 'lye' (alkaline substance) can be formed from the white ashes of burnt saltbush foliage. An excellent home-made soap was once produced in Tasmania by mixing the lye with mutton fat and perfuming this gelatinous mix with favourites from the colonist's cottage garden (lavender, roses), before allowing it to dry. Barilla Bay takes its name from the soap-producing saltbushes found there. According to John Whinray, quoted in Carr and Carr (1981), '*by 1819 people in Pitt Water were making soap of the best quality from cattle suet and marine ashes, probably from barilla in Barilla Bay*'. The word barilla itself is still used around the Mediterranean, where it refers to either the local saltworts (species of *Salsola* and *Halogeton*) or to the crude sodium carbonate ash obtained from burning these plants. Interestingly, the Incas paralleled the use of barilla by using the rinsings from quinoa preparation as a detergent for foaming water.

In conclusion

Goosefoots comprise a family with multiple benefits for humans, but these pale into insignificance compared to their important role in salt-marsh and arid zone ecosystems. We undervalue them at our peril!

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