The Natural News

Central North Field Naturalist inc.
(CNFN)

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WALKS PROGRAM: (see insert for details)

NOVEMBER 16-17TH
Federation weekend at Seaview Holiday Park, Bicheno

DECEMBER 2ND CNFN AGM
Hawley's Rd, Weegena. Meet at 1.00

JANUARY 6TH LAKE MACKENZIE
Meet at Mole Creek at 10.00

JANUARY 19TH
LFNC club outing to Ben Lomond

FEBRUARY 3RD ARBORETUM
Meet at 10.00 at the arboretum

FEBRUARY 29TH & MARCH 1ST & 2ND
Tarkine

MARCH 14TH – 16TH Federation weekend hosted by the Tasmanian Field Naturalist Club at Tiger Hut, Liawenee

WARMING TO THE ICE PLANTS

by Phil Watson

The challenges of global warming are yet to be fully appreciated in relation to their potential impacts on our indigenous vegetation communities and the habitat they support for our threatened flora and fauna. One predicted response will be a relentless search for tolerant species suitable for landscape and revegetation sites which will be able to adapt to the harsher environment. Fortunately members of the ice plant family have a series of rare attributes which will enable them to flourish in these predicted climatic extremes. This article seeks to explore these attributes as well as highlight some of the fascinating cultural, historic and bush tucker values ascribed to its members.

Known botanically as the AIZOACEAE, (Latin for "evergreen" or "ever living"), the name reflects an ability to maintain green fleshy foliage in the harshest and driest environments. There are over 2300 succulents, herbs and shrubs in the family from South Africa, Asia, and North & South America. There are only 60 indigenous Australian species four of which occur in Tasmania. Disturbingly already over 20 naturalised South African invaders thrive in Australia's harsher locations suggesting

climate change may exacerbate their invasive potential.

The family has 2 groups based on the presence or absence of petal-like staminoides (large sterile stamens). The sub family MESEMBRYANTHEMOIDES has showy daisy–like flowers made of these brightly coloured staminoides typically seen in native pigface *Carprobrotus rossii*, whilst the other sub family RUSCHIOIDES has small insignificant flowers which are brightly coloured on the inside as seen in bower spinach *Tetragonia implexicoma*.

Like many Australian species the Tasmanian representatives act as key framework species in saline wetlands and dry coastal communities. Local examples include the Pitt water and Lauderdale salt marshes as well as the remaining 100 kilometres of undisturbed sandy beaches vegetated by indigenous flora.

From an historic perspective immense significance can be directly attributed to two of the family's indigenous species bower spinach and New Zealand spinach. It could be considered that these species are responsible for establishing Australia instead of colonial African nations as the preferred Penal colony.

Adaptive responses to the global warming challenge

Climate change's predicted warming, reduction of overland flows and reduced soil moisture will impose severe habitat limitations on our indigenous plants and animals. However certain plants within families such as the ice plants, native grasses POACEAE and the cactuses CACTACEAE will be advantaged and potentially increase their natural ranges. An obvious example will be kangaroo grass *Themeda triandra* which benefits from a more efficient photosynthetic process (known as a C4 pathway) enabling it to flourish in dry periods when most other grasses withdraw into dormancy. Interestingly, recent observations suggest an increased richness of native grasses on disturbed dark-soil grassy woodland due to their exotic competitors such as Yorkshire fog *Holcus lanatus* and quaking grass *Briza maxima* withering and dying under drought stress.

Remarkably, ice plants have evolved a separate mechanism and are known as "night-time breathers" or technically crassulacean acid metabolism (CAM) that will increase the plants' adaptive capacity to climate change. By storing carbon in the form of organic acids produced during night time respiration they do not need to absorb carbon dioxide by opening their stomatal pores. Hence CAM plants stop moisture loss through their pores during the heat of the day. This endows them with added xerophytic abilities that enhance their succulency mechanism to accumulate moisture and halophytic characteristics to survive in highly saline areas. [i.e. they are drought resistent and salt tolerant. ED]

A family with many appealing names

The family members have intriguing common names, most relating to their ability to survive low moisture or high salinity conditions. The name "ice plant" refers to their leaves being surfaced with salt accumulating bladder-like cells that often sparkle like ice granules to reflect sunlight and reduce transpiration. This name is applied to the fleshy-leaved South African ice plants *Mesembryanthemum* sp. and *Lampranthus* sp. as well as the previously mentioned bower spinach.

The aptly-named "livingstones" or "pebbles" *Lithops* sp. and livingstone daisy *Dorotheanthemum bellidiformis* are designed to

mimic the colours and textures of surrounding stones and pebbles. This ensures survival during arid periods by imparting drought resistance and camouflage from foraging herbivores. During the rainy season when the desert is alive with edible vegetation they transform from their chameleon-like behaviour into large perfumed boldly coloured daisy–like flowers which attract passing insects or butterflies.

The term "noonflower" is another common name given to some members of the AIZOACEAE family including the coastal noonflower *Carpobrotus glaucescens*, the roundleaf pigface (or noonflower) *Disphyma crassifolium* and many South African species. It refers to their habit of opening around noon and closing later in the day. The resulting carpet of pinks and yellows attract insect pollinators which are at their busiest at this time.

The less attractive common name "snot wort" *Conicosia pugioniformis* relates to this succulent's slimy roots which are valued as a South African bush tucker delicacy.

The tasty "greens" were highly valued by early explorers

Ice plants form an important historic connection with Tasmania's convict ancestry. This arose as a consequence of Captain Cook's 1768 voyage to observe the transit of Venus. He satisfied his scurvy-stricken crew's desperate need for fresh greens by harvesting the pot herb New Zealand spinach from the New Zealand shoreline. Following the discovery of large swards of both New Zealand spinach and bower spinach along the Australia coast by Cook and other explorers, they soon came to rely on these greens to enhance their Spartan rations. If the early explorers and colonists had shown a little appreciation for the Aboriginal way of life they would have selected today's popular bush tucker treats included sea-celery *Apium prostratum* and grey saltbush *Atriplex cinerea* instead of limiting their choice to only those plants that resembled English vegetables.

So impressed was Sir Joseph Banks with these ice plants, he sent seeds to Kew Gardens from where they rapidly gained favour in high society as a summer spinach. In 1779 Bank's fondness for this plant's ability to provide reliable nutritious greens was portrayed in the House of Common' inquiry into the suitability of Australia compared to West Africa as a convict-based colony [2]. He obviously left a strong impression and the rest is now history.

Was "pigface" Tasmania's first bush tucker?

Tasman's voyage of 1642 was not only historically significant because of the arrival of the first explorers in Tasmania, but also because of the collection of 'greens' (recorded as a *Mesembryanthemum* sp) by his crew from the banks of the Boomer Creek flowing into Marion Bay. The collection of what is considered to be native pigface was reported to be

"not unlike a certain plant growing at Cabode Bona Esperance" (Cape Town).

Many diaries of early explorers and settlers not only record the edibility of these "greens" but also draw attention to the unique strawberry/fig like flavour of the native pigface's fruits. During the late 18th century a number of explorers referred to the harvesting of ice plants for pot herbage or edible fruits. These included Bligh's 1788 visit to Adventure Bay, Bruny Island and D' Entrecasteaux's 1793 visit to Recherche Bay.

During this visit he noted that:

"the fruit proved a delicacy with the New Hollanders (Aborigines) and resembled the Hottentot's Fig of South Africa (Mesembryanthemum edule) except that the flowers were not yellow but reddish purple".

Settlers at Collin's first settlement at Risdon Cove collected ice plants for nutritious "greens"[5] whilst inland explorer Edward John Eyre partook of pigface fruits, noting the ripe fruit was rich, sweet and refreshing in hot weather.

Robust landscape plants with weed potential

Australia has approximately 25 exotic species recognised as environmental weeds, a number of which derived from naturalising around old settlements, especially near the coast.

The Tasmanian weeds include noonflower *Lampranthus glaucus*, heartleaf iceplant *Aptenia cordifolia*, common iceplant *Mesembryanthemum crystallinum*, yellow pigface *Carprobrotus edulis* and angled pigface *C. aequilaterus*. Of these, the latter two present major concern as they are either out-competing native species or are being inadvertently planted by unaware, enthusiastic bush regenerators. Their ability to release 100's of seeds when triggered by rainy spells or establish from fresh or even significantly dehydrated cuttings ensures they will remain a persistent threat. Given the recent enthusiasm for planting indigenous pigface, it is important to positively identify pigface before planting. Remember, if it has a yellow flower err on the side of caution and check it is not a weedy species!

Valuable "people's plants" supplying food and medicine

It was apparent that explorers and colonists developed a strong desire for the tasty and nutritious green foliage of *Tetragonia* species. This attraction continued to gain momentum over the next two centuries with these pot herbs being cultivated in European gardens. They have now become an heirloom vegetable worthy of any menu, especially being suited to stir fries, spinach dishes and quiches. Of course, they also prove just as attractive to wildlife; hence protection from browsing is required during their establishment. Once growing vigorously the wildlife grazing can be used to advantage as marsupial pruning shears to limit their rampant growth!

It is important to be aware that, like rhubarb and silver beet, it is best not to over indulge due to the low levels of oxalates and saponins existing in the succulent leaves and stems.

In relation to the luscious fruits of native pigface local Aboriginals eagerly awaited their summertime ripening. Aboriginal family bands would often establish camp next to broad expanses of fruiting pigface in order to supplement their fish and seafood diets with otherwise difficult to find offerings of summer ripening bush tucker. They not only enjoyed the fruits but also cooked leaves of this native pigface or at times the roundleaf noonflower to accompany their pit-roasted possum, roo or echidna.

Beyond their bush tucker attributes, the leaves and stems when squeezed ooze a gel-like sap which acted as a soothing lotion in much the same way as Aloe vera. As an aside these bulky, sappy leaves have proven problematical for all those plant collectors and students who have attempted to use plant presses to dry and press specimens. They are a botanist's nightmare!

When exploring the worldwide range of extraordinary plant uses attributed to ice plants, it would be remiss not to mention the captivating mind and mood altering qualities (attributed to the alkaloid

"mesembrine") of the South African species known locally as "Kanna" *Sceletium tortuosum*[4].

This plant has been used by hunter-gathers and pastoralists from prehistoric times to elevate mood and decrease anxiety, stress and tension. Amazingly larger doses have no severe adverse affects, as it induces a euphoric state enabling pastoralists to decrease thirst and hunger or for its application as a local anaesthetic and analgesic for tooth extraction. Traditionally prepared by crushing the succulent plant before sun drying prior to chewing, smoking, inhaling as snuff or brewing as a tea, it is an important child sedative and has been effectively used by indigenous healers to withdraw alcoholics from their addiction. Even now the plant may be called *onse droe dranke*- "our dry liquor". Although once widely traded in the South African Cape province and stocked in trading stores, inventories of wild plants have dwindled due to over harvesting and habitat destruction. This has resulted in its replacement by alcohol, tobacco and cannabis. It is pleasing to note that, using only cultivated rather than wild harvested materials, currently phyto-pharmaceuticals from *Sceletium* are being extracted for clinical trials in readiness for the international market.

Finally it is worth reflecting on another South African pigface look alike known as "Khadi Root" *Khadia acutipetala*. Its fleshy rootstock provides an alternative yeast source to act as the key fermentation agent in brewing a distinctively flavoured, yet extremely prized beer known as Khadi.

Conclusion

The ice plant family primarily consists of hardy resilient plants. Their tolerance is a consequence of their efficient methods of seed dispersal, ease of propagation from cuttings or offsets, their succulence, pest and disease resistance, fire resistance, xerophytic and halophytic abilities all supported by their CAM metabolism. In light of the global warming impacts, it is predicted that their recent popularity as landscape, erosion control, bush tucker and revegetation species will increase.

These competitive advantages will also result in the prevalence of many more exotic members becoming invasive weeds.

Many exotic and native members add a rare three dimensional element to landscapes. This is a consequence of their thick, succulent leaves symbolising shapes of limbs and fingers. They can provide an inspiring contrast with the two-dimensional, flat leaves of the most other plants in the landscape.

References:

The term *night time breathers* was referenced from the Royal Tasmanian Botanical Gardens information sheet "The Century Plant"

Low, T. *Bush Tucker Australia's Wild Food Harvest* Angus &Robertson, Sydney, 1992: 134-135

Potts, B. et al. (ed.) *Janet Somerville's Botanical History of Tasmania*, 2006

Ben-Erik van Wyk and Nigel Gericke *People's Plants A Guide to useful Plants of Southern Africa* Briza Publications 2003

[The common names in this article have been changed to conform to those in *The little book of common names for Tasmanian plants* (2001) by Hans & Annie Wapstra, Mark Wapstra & Louise Gilfedder, DPIWE. Hobart.

This excellent small book is a handy reference in the field. Ed]

KEYSTONE SPECIES

BY SARAH LLOYD

Woodpeckers, sapsuckers and flickers

Australia is the only continent (apart from Antarctica) that has no woodpeckers or other members of the Picidae family. Woodpeckers are prevalent throughout north and South America, Europe and Eurasia; their kin, sapsuckers and flickers, are confined to central and north America. Most are equipped with powerful neck muscles and strong bills with which they excavate their roosting and nesting sites: hollows in living or dead trees.

downy woodpecker ♂

house wren

An extensive study was done on the habits and habitat requirements of red-naped sapsuckers that inhabit the central/ west of North America. Exclusion experiments weren't possible for ethical reasons so the authors went to considerable lengths to ascertain the important role these birds have in an ecosystem. They concluded that red-naped sapsuckers are "double-duty" keystone species.

Like other sapsuckers, red-naped sapsuckers drill a series of holes in living trees. The sweet liquid that accumulates in the wells attracts many species including the orange-crowned warbler, two species of hummingbirds, chipmunks, the occasional red squirrel, vespid wasps and several species of fly.

Each year the sapsuckers excavate a new nesting cavity (they rarely reuse old hollows). Old nesting hollows were used by a range of species including two species of swallow, house wrens, mountain bluebirds, mountain chickadees, northern flickers and Williamson's sapsuckers.

An American beaver adds more material to his already impressive dam wall

American Beavers

American Indians referred to American beavers (*Castor canadensis*) as the "sacred centre" of the land because their amazing engineering feats, their dams, create important wetlands that are used by a range of other animals including mammals, fish, frogs, waterfowl and other birds, including the American bittern (below).

Wolves and coyotes

Large predatory animals such as wolves and coyotes influence the balance of species at lower levels of the food chain. Their disappearance from some regions, either inadvertent or deliberate, through active management that allows deer to thrive and provide a source of game for recreational hunters, has had a marked effect on forest ecology.

Long term monitoring has revealed that the loss of top predators such as wolves, coyotes and grizzly bears has an impact on the understorey plants, migratory birds, litter production in forests and soil nutrient dynamics. The removal of top predators causes an increase in prey species such as the herbivorous moose, elk or deer. An increase in herbivorous animals affects the woody plants in a forest and the recruitment of seedling plants. The plant community influences distribution, abundance and competitive interaction within groups of birds, mammals and insects. This affects litter production and soil nutrient dynamics. Thriving seedlings and understorey plants provide habitat and shelter for small bird species.

Thus, woodpeckers, sapsuckers and flickers, beavers and large predatory animals like wolves and coyotes are referred to as "keystone species" because they play an integral role in forest and woodland ecosystems. Keystone species are defined as species whose removal from a community would precipitate a reduction of species diversity or produce significant changes in community structure or whose presence or abundance has a disproportionate effect on the processes of an ecosystem. **In other words, a keystone species is one whose impact on its community or ecosystem is larger and greater than would be expected from its relative abundance or total biomass.**

The keystone species concept was first introduced by American zoology professor Robert T Paine in 1969 and has become a cornerstone concept in the principals of conservation biology. The persistence of keystone species is seen as vitally important to ecosystem function and it is therefore imperative that they be identified and every effort made to retain their habitats.

The situation in Australia, however, is very different to that in the United States. Australia has no extant large carnivorous mammals, no primary excavators such as woodpeckers and no landscape engineers like beavers. Consequently keystone species, or highly interactive species as they are sometimes known, may be a little more difficult to identify here.

Often it is only when species decline to the extent that the effect of their absence is apparent (as in the case of the wolves and coyotes) that their importance to a properly functioning ecosystem can be fully appreciated.

Tasmanian Devil

The tragic demise of the Tasmanian devil is a case in point. In an article entitled "The cascade effect" (Brennan 2007) some of the implications of the devils' decline are outlined.

According to wildlife biologist, Nick Mooney, the decline in devil numbers may already be having an effect on the environment. The absence of a carnivorous animal which is primarily a scavenger results in a build up of carrion, an abundant food source for other carnivorous animals. Anecdotal evidence suggests that quolls and Forest Ravens are increasing where devil numbers have decreased.

Spotted-tailed quoll

Feral cats and dogs also seem to be increasing in devil deficient areas with implications for other fauna including birds and small mammals. Cats spread toxoplasmosis, a common disease of particular concern to pregnant women and the agricultural industry where is causes sheep and goats to abort.

Tasmanian native hens could be threatened because of predation by the fox

The increase in numbers of the red fox, which have hitherto been kept in check by the devil, could sound the final death knell for many of Tasmania's small marsupials, (most of which have been extirpated on the mainland because of the fox) and ground dwelling birds.

Devils are not predators, but they probably do take live animals, particularly unhealthy wallabies and possums, thereby minimising the risk of disease outbreaks.

Over the past few decades numbers of rufous wallaby have increased dramatically. While this is probably because of changes to the landscape (rich pasture where they forage is adjacent to patches of bush where they shelter) the decline of a carnivorous marsupial (concomitant with the decline of other top predators including Wedge-tailed Eagles and Grey Goshawks) may lead to further increases in these herbivorous animals with similar impacts as the removal of large predators from the north American ecosystem, i.e. increased grazing pressure

Masked Owl: another top predator recently added to the threatened species list

on native plants and a simultaneous decline or deterioration in breeding and foraging habitat of native bird species.

Small ground-foraging marsupials

A further example comes from the semi arid lands of mainland Australia. It has been hypothesized that the almost complete loss of small ground-foraging marsupials shortly after European settlement contributed to the rapid deterioration of soil health and associated changes to communities of flora and fauna.

The role of small marsupials, fungi (especially mycorrhizal species) and soil health has been outlined in an article by Greg Martin (Martin 2003). Martin was able to observe a suite of small mammals including bettongs, potoroos, bilbies and bandicoots, at the feral-proof Scotia Sanctuary in far western New South Wales. He also undertook some historical research to ascertain their previous abundance and possible importance in maintaining soil health. Like the case of the Tasmanian Devil, it is the demise of these small animals and the consequent changes that have occurred that reveals their importance to ecosystem function.

The landscape before settlement

Anyone who visits the semi arid region of mainland Australia will see a degraded ecosystem continuing to deteriorate. Topsoils are hard and compacted, trees are old and dying and there is little or no regeneration of native vegetation. Early historical accounts, however, describe a very different landscape with extensive tracts of productive, species-rich grasslands and scrublands with soft friable soils. Rather than being caused primarily by land clearing, the introduction of hard-hoofed domestic livestock, pests such as rabbits and changed burning practices as is so often asserted, the deterioration could be attributed to the decline and extirpation of small ground dwelling marsupials such as bettongs, potoroos, bilbies and bandicoots.

Before Europeans and their livestock settled the semi arid lands the soils were described as "soft, spongy and very absorbent" and they supported a luxuriant growth of native grasses. George Riddoch noted:

"When I got away from the track the horses went up to their fetlocks in loose friable soil... it was like a well tilled field; and the moisture, as it fell, penetrated the soil and fertilized the plants. Now it is scarcely an exaggeration to say that the very ground I am speaking of rings under the horses hooves"

In the south western district of Victoria one landowner documented the decline of his property:

"the long deep-rooted grasses that held our strong clay hill together have died out; the ground is now exposed to the sun, and it has cracked in all directions, and the clay hills are slipping...there have been hundreds (of landslips) in the last three years...Rats seven, eight and ten feet deep, and as wide, are found for miles where two years ago it was covered with tussocky grass...it requires no great prophetic knowledge to see that...every year it will get worse."

Soils

Australia's soils are old, weathered, shallow and infertile. They are dependent on biological activity in the upper levels, especially in areas of low rainfall, much of which is facilitated by the activities of small mammals.

As they search for food (fruits, seeds, roots, invertebrates, tubers and fungi) by scratching and digging, bettongs, potoroos, bilbies and bandicoots incorporate plant

material with the mineral layer, spread mycorrhizal fungi and seeds and generally improve conditions for water retention and absorption. The small depressions in the soil resulting from their scratching are nutrient-rich germination sites.

As soil is worked, the organic matter is broken into smaller particles and mixed with the soil. Smaller pieces of organic matter have a larger surface area and are more easily broken down by soil biota such as bacteria, fungi, nematodes, algae, protozoa and viruses which recycle the nutrients thus increasing soil fertility. Furthermore, breaking up and mixing the organic matter into the soils may reduce the accumulation of combustible plant material, reducing the risk of wildfires

The tragic disappearance from many areas of these small marsupials is attributed to the fox, feral cat, herbivores including rabbits, sheep and cattle, habitat destruction and changed fire regimes.

Sadly, there are very few early accounts of the distribution and abundance of these small marsupials, mainly because of their nocturnal habits. Nevertheless, some descriptions suggest that where they were locally abundant they had a marked impact on their environment.

The Burrowing bettong (*Bettongia lesueur*), or rat kangaroo, occurred in such large numbers in some areas that their diggings covered several acres of ground

"*many dwelt together in extensive burrows, even more than eight feet deep...It was said to be very destructive in settlers' gardens eating almost every kind of vegetable, especially peas and beans.* (Troughton 1957)

Burrowing bettongs are the only macropod that regularly shelter in burrows with 100 animals sometimes sharing extensive warrens. Studies of relict burrows suggest that their density could have reached 70 animals per square kilometre in some areas.

Observation of the activities of brush-tailed bettongs (*Bettongia penicillata*) has lead researchers to calculate that they dig between 20 and 100 times a night and may turn 6 tonnes of soil per annum. Other digging animals perform similarly, though this will vary depending on the species. At Black Sugarloaf recently we observed the results of the nocturnal activities of an unknown marsupial, probably a southern brown bandicoot, whose diggings which result in a soft friable soil, resemble the work of a mechanical tiller.

The decline of small ground dwelling marsupials early in the days of European settlement may have had an impact on Australia's biota disproportionate to the size of these diminutive animals and perhaps they too were (and still are where they occur) keystone species.

southern brown bandicoot

After researching for this article I have concluded that it is doubtful whether the keystone species concept could have been conceived in Australia.

An online abstract "On the Nature of Keystone Species" (Vanclay 1999) provides further food for thought:

"There is an unfortunate tendency to nominate large and conspicuous creatures as likely keystone species playing pivotal roles in ecosystems. Particular favorites in the tropics include fig trees (Ficus spp.), large apes, and colorful birds, but such claims are rarely supported by empirical evidence ... I am sceptical; I suspect that inconspicuous organisms may be the ultimate arbiters of ecosystem function and appearance. Mycorrhizae play a critical, possibly pivotal, role in many forests, and they and other fungi may be more realistic candidates for the title of keystone within forest communities. Similarly, experience in Australia suggests that insects such as the Cactoblastis moth (Cactoblastis cactorum) and insect vectors of Myxomatosis have a greater influence on pasture dynamics than do the more conspicuous herbivores. I suspect that the roles of most organisms in ecosystems may be matters of degrees rather than absolutes such as "pivotal" (and conversely, "redundant"). I advocate caution in promoting these concepts without further evidence to support such claims."

References

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Photographs: Sarah Lloyd

Without primary excavators such as woodpeckers in Australia, trees may take up to 80 years to form suitable hollows for small bird such as the Striated Pardalote (above) and several hundred years for larger birds like owls and cockatoos.

Patron: Dr. Peter McQuillan

The Natural News

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Orchid supplement

January 2008

threehorned bird-orchid
Simpliglottis triceratops

yellow rock orchid *Dockrillia striolata*
Bicheno, November 2007

hyacinth orchids *Dipodium roseum* are leafless epiparasites that live in association with the roots of eucalypts and a mycorrhizal fungus.

great sun orchid *Thelymitra arenaria*
Black Sugarloaf, December 2007

flying duck orchid *Caleana major*
Winifred Curtis Reserve, November 2007

strap beard-orchid *Calochilus paludosus*
Winifred Curtis Reserve, November 2007

eastern wallflower diuris *Diuris orientis*
Henry Somerset orchid reserve October 2007

spider orchid *Arachnorchis caudata*
Henry Somerset orchid reserve October 2007

The classification of plants:

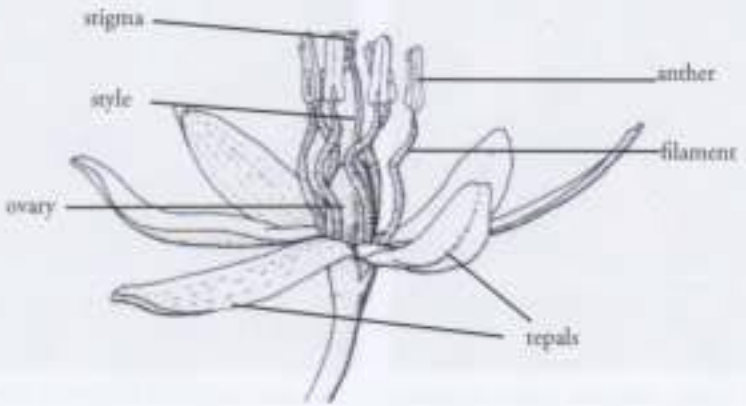
The classification of plants is based on the characteristics of the sexual reproductive organs which in Angiosperms (the flowering plants) are found in the flowers.

←The stamen is the male reproductive organ. The terminal portion of the stamen, the anther, contains the pollen. The stalk is called a filament.

←The pistil is the female reproductive organ. The terminal portion of the pistil, the stigma, receives the pollen. The style is the stalk between the stigma and ovary.

What makes a lily?

Lilies are the nearest relatives of orchids. Like orchids, lily flowers have six parts: three sepals outside three petals. In lilies these are generally similar in shape and appearance. (In flowers where there is no distinction between the sepals and petals these parts are called tepals.)
The reproductive parts of the lily consist of six stamens, each stamen has a filament (stem) topped by the pollen bearing anther. The stamens surround the female reproductive structure which consits of the ovary, style and stigma.
Orchid flowers have only one fertile stamen (sometimes two) which does not have a filament. It is fused to the female structure to form the column.

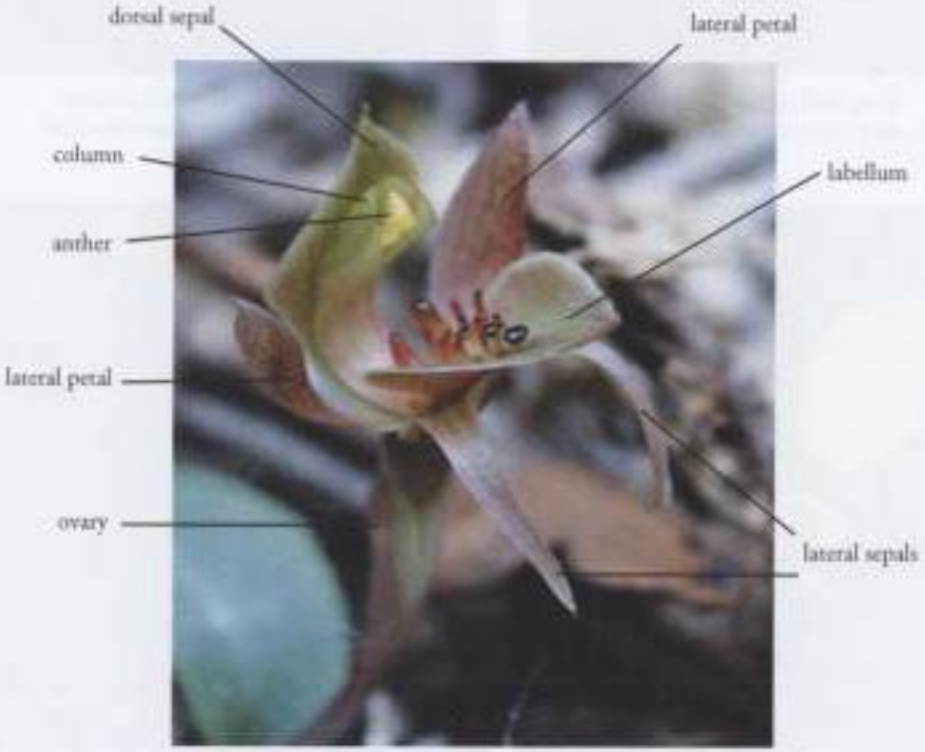


Flower of tufted blue lily (*Stypandra caespitosa*)

What makes an orchid?

Orchids are believed to be the most highly evolved form of plant life. This is because of their floral structure and the plants' specialized methods of attracting insects for pollination.

Orchid flowers are usually irregular or zygomorphic, i.e. bilaterally symetrical.
The perianth (sepals and petals - the non reproductive part of the flower) is in 2 whorls: the 3 segments of the outer whorls are sepals; the dorsal sepal is often much larger than the 2 lateral sepals.
The 2 lateral segments of the inner whorls are called petals. The remaining segment is a modified petal called the labellum. This is usually at the front of the flower and has glands, hairs, lobes or is finged with hairs. Its major role is to attract insect pollinators.
Sometimes, e.g. in *Thelymitra* (sun orchids) species, the labellum is similar in size and shape to the other petals.
The styles, stigmas and stamen(s) are close together in a structure called a column.



Above: flower of threehorned bird-orchid (*Simpliglottis triceratops*)

References: Jones et al (1999) *The orchids of Tasmania.* The Miegunyah Press, Melbourne
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