



Plant Focus: *Macrozamia reidleyi*

Frances Kirchner, Herbarium Liaison Officer, DEC

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Macrozamia reidleyi (zamia palm) is smaller than other Western Australian species of *Macrozamia* with fewer leaves but glossier and flat leaves. They tend to occur on lateritic soils in the Jarrah forests of WA and are known to be widespread and abundant as understory species in these conditions, flowering between September and October.

Macrozamia's take the form of a cycad, which are living fossils dating back to the Jurassic Period some 280 million years ago and are believed to have played a large role in the diet of dinosaurs.

Cycads do not produce flowers but rather produce cones. The pollen is produced by cones of the male plant whilst the female cones produce the seed. Further research is required but it appears that pollination may occur through insects which have been observed both in the male and female cycads.

Research on other *Macrozamia*'s within Australia has shown that most cycads are "involved in dependent mutualisms with specialised insect pollinators (Terry et al, 2005)" with these insects undertaking all parts of their life cycle upon their cycad host.

The zamia palm is one of the earliest poison plants recorded in Australia with Vlaming in 1697 recording the sickness of his men caused as a result of the men eating the plants seeds. As early pastoralists found out, cattle in particular were severely affected by the consumption of the plant with the result of a condition termed "rickets" effectively paralyzing the animals' hindquarters.

Not all animals however are affected by the plants poison characteristics, with many native animals' active agents in its seed dispersal. According to a study by Burbidge and Whelan (1982) kangaroos and possums have been noted as assisting in seed dispersal, with possums recorded as feeding upon the red, outer layer of the seeds. In fact, without the assistance of these animals *Macrozamia reidleyi* would find it difficult to disperse its seed given its large size and weight preventing other forms of dispersal such as wind dispersal.

The seeds of the *Macrozamia* as well as a number of other native plants contain poisonous glycosides which are confined to inside the stony layer and thus would not affect those animals that swallow the seeds whole (provided the seeds are not subsequently broken up in the gut) or only eat the outer flesh.

Thus one can assume that the toxic chemicals which occur in all cycad species have developed to protect seedlings as

well as established plants from predation by herbivorous animals but at the same time have formed in a way that provides for them a means of seed dispersal, explaining how the native animals of WA are able to make use of *Macrozamia* seeds.

Macrozamia reidleyi also responds well to fire with studies indicating that a high proportion of plants within a population will reproduce at once in the second year after a fire.

Whilst *Macrozamia reidleyi* is under no current threat of extinction continued conservation of this species must not focus solely on the plant itself but must incorporate all of the above facets integral to its subsistence. ☼



Macrozamia reidleyi.
Photo by F. Kirchner & FloraBase

Ref:

'Zamia Palm Poisoning' by F.C.Wilkinson.

'Pollination of Australian *Macrozamia* Cycads' by L. Terry.

'Seed Dispersal in a Cycad, *Macrozamia reidleyi*' by A.

The Editors Spiel

Frances Kirchner, Herbarium Liaison Officer, CALM Bunbury

Over the past month I have had a number of requests for articles on specific flora so I have endeavored to provide some of these in this edition. If you are interested in researching a particular species, please feel free to write me an article!

Spring is now virtually upon us and the plants of the South West are starting to flower. I'm sure many of you have busy collecting days planned to take full advantage of this season.

I myself will be busy undertaking surveys of threatened orchids along the Swan Coastal Plain, including

searches for the critically endangered *Caladenia caesarea subsp. maritima* (see attached article), *Caladenia busselliana*, *Caladenia procera* and many more. I hope to involve regional herbaria volunteers as much as possible so please let me know if there is a particular species you are interested in and would like to be involved in surveying for.

Another important note, which is reiterated on the back page, if you find a threatened or priority species during your surveys you MUST inform your local DEC officer so that protective measures can be

undertaken.

Thankyou to all who attended the Plant Identification course in Manjimup and most of all thankyou to Ian MacFarlane and Ray Cranfield for providing their expertise at the workshop.

For this newsletter to be relevant and informative we require your input and stories from the field so keep those articles coming

Closing date for the Summer editon: 17/11/06. ☀



Caladenia caesarea subsp. maritima

Photo by T. Brown

“Please let me know if there is a particular [orchid] species you are interested in and would like to be involved in surveying”

Sedges and Rushes ID Workshop

To be presented by Greg Keighery

A free sedges and rushes identification workshop is being held in Busselton with the expertise of Greg Keighery and supported by GeoCatch's Lower Swan Coastal Plain Wetlands Project.

The workshop will focus on identification of sedges (Cyperaceae) and rushes (Juncaceae) of the Swan Coastal Plain, including introduced varieties. The morning session will cover theory, followed by an afternoon field session at two wetlands in the Busselton

area. Lunch and bus transport for the field session will be provided.

Please bring in samples of sedges/rushes!

Date: Friday 15th September
Venue: St Mary's Family Centre, Busselton.
Time: 8.30am - 4:30pm

Please RSVP by Friday 8th September to Mandy Polley at GeoCatch: 9781 0108 or amanda.polley@water.wa.gov.au.



Eleocharis keigheryi

Photo by G. Keighery,



Bolboschoenus caldwellii

Photo by J.F.Smith, FloraBase



Juncus kraussii

Photo by R. Davis, FloraBase

Threatened Orchid Field Trip (23/8/06)

Mary Shannon, Bunbury Regional Herbarium volunteer

On a more spring-like than winters' day, we headed to the area between Cape Naturaliste and Dunsborough in search of the threatened orchid *Caladenia caesarea subsp. maritima*.

After initially finding some Donkey orchids we later came upon the Cape Spider Orchid (*Caladenia caesarea subsp. maritima*). It was elusive, but gradually we found more of them, after getting 'our eye in' with spotting them. At one stage, I was sure I'd seen the orchid fairy, but that was Tenielle taking a photo.

The Cape Spider Orchid has elegant, greenish-yellow and brown petals and sepals, and a clump forming habit. Although it is locally common, and often grows in clumps of 10 or more, it's found only on a few coastal granite outcrops, in an area that is under constant pressure from recreational activities.

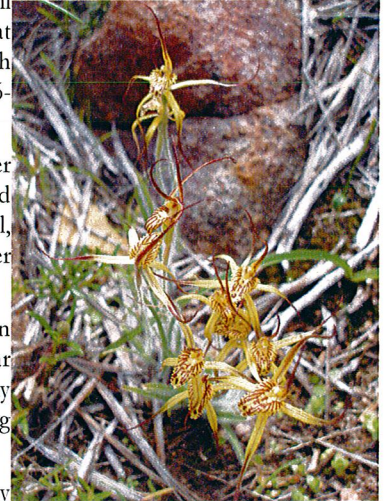
It grows between 15-20cm high, with stiffly held petals and sepals. The prominent yellow

and brown striped labellum (lip) is thrust well forward, before curving slightly downward at the tip. There are 1-3 flowers per plant each being 5-6cm long by 3-5cm wide. The leaf is 6-9cm long and 4mm wide.

A distinctive feature is the slightly smaller flowers than that of the Mustard Orchid (*Caladenia caesarea subsp. Caesarea*). A coastal, rather than inland distribution and an earlier flowering period.

It flowers August to September and grows in shallow soils on coastal granite outcrops near Dunsborough. It is classified as critically endangered with weeds and rabbits impacting on some populations.

(Ref: 'Western Australia's Threatened Flora' by A. Brown, C. Thomas-Dams and N. Marchant).



Caladenia caesarea subsp. maritima

Photo by T. Brown

Friends of Perup Open Day

Erica Shedley, Regional Herbarium Project Officer, DEC

An enthusiastic group of people met recently at the Perup Ecology Centre to participate in the Friends of Perup Open Day. Nestled in the Perup Nature Reserve, between Boyup Brook and Tone Bridge, this Centre is ideally located to conduct research and promote a deeper understanding of the ecology of the eastern jarrah-wandoo bushland.

We enjoyed an interesting afternoon of poster displays and talks by staff from the Department of Environment and Conservation, introduced by the new president Mr. Neal Watson. DEC Ranger, Julia Northin broadened our knowledge about the life history of threatened native fauna species in the Perup area, including the woylie, phascogale, numbat and chuditch. DEC scientist Adrian Wayne then explained how the population of the once locally abundant Woylie, has dramatically declined in the last three years. He outlined the many lines of inquiry that DEC is following to shed some light on this decline, including the possibilities of introduced disease, decreased food availability, and increased feral cat populations. DEC regional ecologist Roger Hearn talked about the Lake Muir-Unicup recovery catchment project involving a

comprehensive deep drilling program to understand the presence and flow of underground aquifers in that area. Ian Wheeler then described a large catchment revegetation program using native seedlings to prevent saline discharge, and the development of acid sulphate soils, which are contributing to the collapse of several important wetlands in the area.

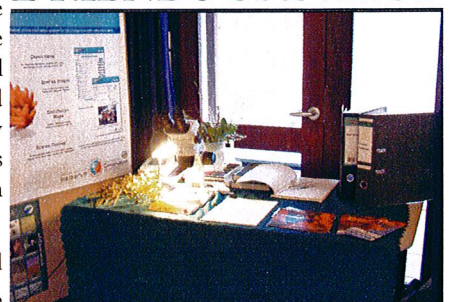
Visitors to the Open Day were interested in the Regional Herbarium display, with nearly 100 mounted specimens from a recent flora survey of the area. A stereoscope was available for visitors to zoom into the microscopic beauty of the local wildflowers. This display stimulated members of the Manjimup University of the Third Age to assist the Friends of Perup with their next flora survey in October.

Local wineries offered wine, olive oil and food samples to warm the hearts, while the Friends of Perup treated visitors to a gourmet sausage sizzle around a roaring fire.

“Visitors to the Open Day were interested in the Regional Herbarium display, with nearly 100 mounted specimens from a recent flora survey.”



FRIENDS OF PERUP



Regional Herbarium display at the recent Perup Ecology Centre Open Day

Collection of Lichen Specimens

R.J.Cranfield, Botanist/Lichenologist CALM Science (WA Herbarium), Manjimup

The collection of lichens is relatively easy and with less documentation required compared to that of the vascular and other non-vascular flora. Lichens can be collected either moist or dry and are usually sampled with part of the substrate.



Calicium tricolor

Photo by R. Cranfield

Equipment required:

- Note book or collecting book
- Knife
- Wood and cold chisels
- Hammer
- Secateurs
- Small paper bags
- Roll of toilet tissue or tissues
- Safety glasses
- Bag or box to carry samples

Collection data:

- Same as for vascular flora

Exception is the plant description.

Collection:

The mode of collection depends upon desired sample and the type of substrate the species is present on. In most instances the sample is either cut off or gouged out of the substrate and a portion can be easily removed.

With lichens the whole or a large portion of the plant is cut off with a portion of the substrate intact e.g. rock pieces are chiselled off, bark peeled, twigs lopped and pieces of wood removed with a chisel. When using both wood and cold chisels it is advisable to wear eye safety glasses.

Keep the collected samples bagged in separate numbered bags as they are easily mixed up. In the instance of lichens on a twig or branch place a 20 cm piece of twig into a bag and separate the lichen species later under a microscope.

These plants are true resurrection species and as required can be reactivated by spraying with water to make pliable or to record fresh colour. Samples can be placed into plastic bags but will require extra work to restore your samples because they can't be dried in plastic, unlike paper, but in field situations this may be the easy way to proceed. These plastic bags can be held in a fridge to retard growth and will allow you time to process away from the field. When

wet these species are robust but it is advisable to separate rock samples from other samples, especially fragile soil collections. Dry samples are extremely fragile and can be easily damaged in transport. Soil samples can be wrapped in toilet tissue for transport but will require stabilising with 10% solution of Aquadhere on the under side of the sample as soon as possible.

Do not keep damp samples in plastic bags for long periods as fungi will develop, especially in warm situations and will ruin your sample.

To dry, place numbered paper bag or toilet tissue in a warm air drying oven or a fruit drier until dry. At this stage your sample may become fragile and will require careful handling.

Duplicate material is desirable but be careful not to exterminate populations. Note that there are several rare species recognised and as such are protected just as for the vascular flora. As with vascular flora, a collection licence is required.

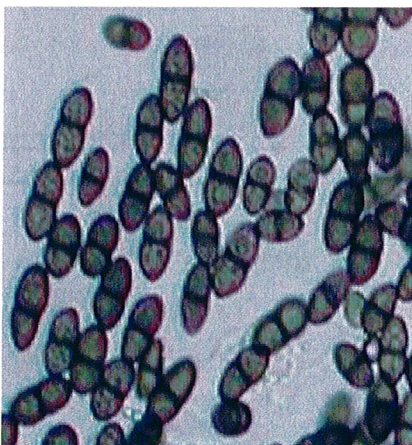
Processing:

The numbered samples are glued onto card or placed in folded envelopes after thorough drying. The samples are glued to the card and placed in a cardboard specimen box of which there are 3 sizes. Samples that are too large can be trimmed using a saw if on wood or carefully broken up if on rock. At this stage a specimen label is prepared, using the computer program Max if possible. It is required that vouchers be lodged at the Perth Herbarium with a duplicated set in your Regional Herbarium.

Identification:

Identification of lichens involves macro and microscopic examination along with chemical spot testing, and sometimes thin layer or gas chromatography to determine the chemical components of individuals. In most instances visual examination will help you to determine the family or genus with the species separated by either spore characters or chemical reactions. Several published keys and descriptions are available along with access to several web sites that may have an electronic type key. The matching of specimens with named herbarium samples is highly desirable as many species are variable in appearance so that when identified without this checking errors may result. It is anticipated that in the next couple of years the Herbarium FloraBase will have lichen images available to assist in the determination of lichens.

"Do not keep damp samples in plastic bags for long periods as fungi will develop"



Calicium tricolor spores

Photo by R. Cranfield

Collecting data:

Use the collecting forms: fill in as many fields as possible, but remember that the specimen will be useful even if only some fields are filled. ☀

Site No.:

Associated Vegetation:

Muir Classification:

Life Form Density Classes (LFDC) [number of layers]:

Horizontal View Distance (HVD) [1.5m from ground level]:
 1-20m 20-50m 50-100m 100-150m 150m+

Floristic Richness: 0-20 21-50 51-100 100+ species

Seeding and Sapling Abundance: Very few Moderately abundant Abundant

Habitat: Plain/ Valley/ Breakaway/ Outcrop/ Hill/ Dune/ Ridge/ Flood Plain/ Water Course/ River/ Lake/ Pool/ Swamp/ Wetland/ Salt Lake/ Modified/ Road or Rail buffers/ Other

Micro habitats: Soil/ Stream banks/ Litter or organic mats/ Stones/ Rock sheets/ Overhangs crevasse/ Logs burnt unburnt decaying/ Shrubs alive dead/ Trees alive dead/ Other

Site Aspect: N S E W **Site Modifier:** open/ closed/ exposed/ mist layered/ disturbed

Slope of area (angle of inclination °):

Weed Abundance: nil few common Abundant

Dead Plants (in an area): Absent/ Present/ % of Population:

Fire History (year): **Time of Fire:** A / S / Su / W /

Fire Type: Wild/ Controlled

Erosion/ Disturbance: Absent/ Present **Type of Erosion:** Water/ Wind/ other

Soil Surface: Bare/ Littered/ Gravelly/ Stony/ Cryptogamic/ Crusted/ Compacted/ Loose/ Soggy/ Moist/ Dry/ Modified/ other

Litter Depth (cm): **Litter Condition:** new / old / broken down

Soil Colour: Red/ Brown/ Yellow/ Black/ White/ Grey/ Mottled/ other

Soil Type: Sand/ Clay/ Loam/ Sandy Clay/ Clayey Sand/ Peaty/ other

Soil pH: **Underlying Geology:**

Type of Rock Outcropping: % of Area:

Locality:

Map Sheet: **Contour Range (altitude):**

Latitude: ° ' " S Longitude: ° ' " E

GPS Fixed: Y N **Datum Used:** WGS84, AUS84, AGD84, GDA94

Collector(s): **Date:**

Cryptogam Collecting Book

Det Name: **Family:**

Field Ident:

Collection No.: Epiphyte/ Saprophyte/ Parasite/ Free living

Biotic Type: Dormant/ Active/ Vegetative/ Fruiting/ Desiccated/ Stressed/ other

Growth Phase: Exposed/ Sheltered/ Wet/ Dry/ Wood (alive/ dead/decaying/charred)/ Bark (alive/ dead/charred)/ Leaf (alive/dead)/ Charcoal/ Ant Hill/ Soil/ Stone (epipetric)/ Dung/ Organic Material/ other

Facultative Host:

Associated cryptogams:

Stratal position: ground level (0-30cm) shrub layer (31cm-3m) tree layer (3.5m+)

Frequency of Occurrence (Micro): Numerous/ Frequent/ Occasional/ Solitary/ Localised

Site Area Frequency: Abundant/ Frequent/ Occasional/ Isolated/ other

Taxa Description

Lichen

Group: Filamentose Foliose Crustose Fruticose Leprose Squamulose

Thallus: erect immersed appressed not obvious

Thallus Colour: Wet/ Dry **upper surface** **lower surface**

Fruit Bodies: Absent/ Present/ other **Colour:**

Fruit Structures: Stalked/ Podetia/ Mushroom/ Lirellate/ Lecanorine/ Lecideine/ Perithecia/ Arthoniid

Liverwort/ Hornwort

Thallus Colour: Wet/ Dry

Spore/ Fruit Bodies: Absent/ Present/ other

Moss

Plant Colour: Wet/ Dry

Spore/ Fruit Bodies: Absent/ Present/ other

ALGAE

Habit: **Colour:**

Habitat: Marine/ Fresh Water/ Terrestrial/ Organic material/ Other

Chemistry: **Cortex** **Medulla**

K	K	P
C	C	I
KC	KC	N
		UV

Discovering Declared Rare Flora - *Jacksonia velveta*

Lyn White, West Arthur-Darkan Regional Herbarium Volunteer



Jacksonia velveta.

Photo by C. Brox and J.A. Cochrane, FloraBase

Few people in West Arthur realize how much the district owes to Val Crowley and Jan Smith of Darkan. Proof of their knowledge, together with that of Wendy Cusack, West Arthur's orchid expert who now lives in the city, is in our extensive flora collection, which includes a number of declared rare flora.

The occasional sojourn through the remnant vegetation on my son's property at Dardadine has proved to be a revelation. So whenever "a look through the bush" is suggested, it is difficult not to feel excited!

One July day a few years ago,

the unusual shape of a leaf attracted Val's attention. It was much like that of holly, but with the points alternating with those opposite. Val did not recognize it as anything she had seen previously. Between flowering seasons, but with some old flowers still attached, it was obviously a pea similar to - or possibly the same as - the *Jacksonia* in the rare flora book. Only two populations of this were known to exist; one near Collie, the other Woodanilling.

Val needed to see it in flower, and with each of her visits we discovered more plants, eventually estimating a dozen

adults and a similar number of seedlings. It was a long wait, however, for the exquisite yellow flowers did not appear until late October. Val's suspicions were eventually confirmed by Dr Jenny Chappill, Papilionaceae specialist.

This same remnant vegetation is also host to Priority sp. *Styliidium coatesianum*, *Persoonia sulcata*, *Xanthorrhoea brevistyla*, *Eucalyptus aspersa* and *Synaphea flabelliformis*.

Remnant bush in our agricultural area is worth very little money, but what price its real value? ☼

"Remnant bush in our agricultural area is worth very little money, but what price its real value?"

Look Out For: *Eucalyptus* (guava) rust

Summary of article by Department of Agriculture, Fisheries and Forestry

Eucalyptus rust (*Puccinia psidii*), or guava rust as it is also known, is an exotic fungal disease that belongs to the myrtaceae family.

Whilst the rust does not as yet exist in Australia it is considered to be a serious threat to Australia's eucalypt production and natural ecosystems.

The rust attacks juvenile leaves, flowers, shoots and fruits of a number of species within the Myrtaceae family. The first signs of infection are tiny raised spots or pustules on infected tissue. After a few days these pustules turn into a

very distinctive egg-yolk yellow colour.

The infected leaves will deform and shrivel with severe infection leading to defoliation and stunted growth. Continued exposure or recurrent exposure may lead to tree death.

The rust spores are very small and may remain viable for many months enhancing the potential for its transfer to Australia.

A number of strategies are currently being enacted to prevent the eucalyptus rust from entering the country. Public awareness of the

symptoms of the rust is vital to ensure that immediate action is taken if the rust is discovered within Australia. ☼



Puccinia psidii

Report suspect detections to your local department of agriculture or primary industry, call the

EXOTIC PLANT PEST HOTLINE

1800 084 881

For more information: www.daff.gov.au/plantpesthotline

Regional Herbarium Plant Identification Workshop

Erica Shedley, Regional Herbarium, Project Officer, DEC

Senior research scientist Dr Terry Macfarlane and Ray Cranfield from the Department of Environment and Conservation recently conducted a most enjoyable and informative Plant Identification Workshop at Manjimup.

Twelve enthusiastic regional herbarium network members gathered from Walpole, Kojonup, McAlinden, Donnybrook and Bridgetown. They listened to Terry's interesting introduction about plant names, flower structures and FloraBase, then busied themselves in the task of identifying fresh specimens of Restionaceae, which was the focus plant family for this workshop.

A variety of other local flowering plants were also keyed out, with most people reaching the same outcome! A few newcomers from Donnybrook found using the keys a bit daunting but with assistance from Terry and Ray, managed to grasp an understanding of the

procedure, and are keen to learn more. Terms used in keys are often confusing and it is usually necessary to have a good glossary close at hand. More experienced members relished the opportunity to revise some families, including Fabaceae and Epacridaceae, and greatly appreciated the many 'insider' tricks of the trade which Terry and Ray willingly passed on.

It is hoped that these workshops can be held annually to help members revise particular plant families, and to encourage new members to have confidence in using electronic databases and plant identification keys. ☀



Regional herbarium members Ted Middleton from Walpole, and Chris Lewis, Kath and Dan Mathwin from Kojonup discuss a Restionaceae specimen.



DEC scientist Ray Cranfield explains flower morphology to regional herbarium members Jenny Dewing and Cheryl Hamence from Bridgetown, and Dale Green from Donnybrook.

"Terms used in keys are often confusing and it is usually necessary to have a good glossary close at hand."

Upcoming Training Opportunities

CRC for Plant-Based Management of Dryland Salinity

22/09/06 Free Public Seminar - Recovering Salt Affected Land. Presented by Dr. Richard Bell, 7:00pm @ St. John's Lutheran Church Hall, 16 Aberdeen St Northbridge.

Skills for Nature Conservation

4/11/06 Knowing & Managing Native & Introduced Grasses

For more information go to :

http://www.naturebase.net/urbannature/pdf/SFNC_Calendar_06.pdf

Or phone 9374 3333

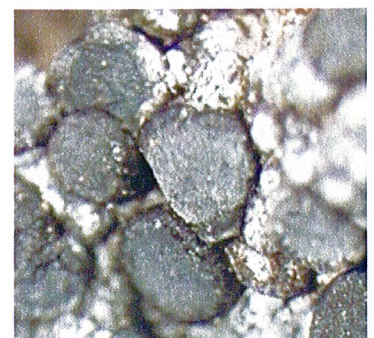


Useful Keys to ID Lichens

Flora of Australia vols 54,55,56a,58a plus Supplementary series 11 and 23

Lichens- An Illustrated Guide to the British and Irish Species by Frank S. Dobson

Electronic keys currently under production



Toninia australis

Photo by R. Cranfield



For information or to submit an article contact

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Useful Websites:

<http://florabase.calm.wa.gov.au/>

<http://www.calm.wa.gov.au/>

<http://www.lotterywest.wa.gov.au/>

Re-discovery of priority species by Regional Herbarium Volunteer

Ongerup Regional Herbarium volunteer, Lynda Strahan re-discovered the species *Tymalium myrtillus* subsp. *pungens* whilst surveying for mallefowls in the Corackerup region. The species was last collected in 1988 by S. Hooper after originally being recorded by W. Blackall in 1938. The species is an erect, spreading, spinescent shrub growing up to 3m in height. Flowers in Spring are of cream and yellow. The re-discovery of this priority one species highlights the importance of volunteer efforts and their invaluable botanical skills (even when out searching for mallefowls!).

IMPORTANT

If you locate a population of a rare or endangered species you **MUST** report it to your local DEC officer so that they may commence protection measures!!

Funding Opportunities

If you would prefer to receive this newsletter in electronic format please let me know.

- **Lotterywest and the Gordon Reid Foundation** have ongoing grants available to community organisations involved in the Conservation of Western Australia's natural habitats and diversity. Find out more at <http://www.lotterywest.wa.gov.au/>
- The Australian Government has announced funding of \$37 million for the **National Landcare Programme (NLP)** for 2006/07 to encourage on-ground action that will result in enhanced sustainable natural resource management at the farm, catchment and regional level. Find out more at <http://www.landcare.gov.au/>
- The **Bankwest Sponsorship Fund** supports programmes and initiatives which benefit the community of Western Australia across a wide variety of areas. This funding can be accessed all year. For further information visit http://www.bankwest.com.au/newsroom/in_the_community/how_to_apply_for_sponsorship/index.asp or phone 131718.
- **Fosters Community Grants** support projects in all aspects of the natural environment. This round closes 29th September. Find out more at <http://www.fosters.com.au>