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Western Wildlife

LAND FOR WILDLIFE

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THE AUSTRALIAN MAGPIE

by Ian Rowley

LARGE and conspicuous with its black and white plumage, the Australian Magpie is probably the best known of our native birds and its beautiful carolling gives the lie to the early colonists' report of Australia being 'a land of songless birds'. At a time when we are repeatedly reminded of fauna and flora becoming rarer as a result of land clearing and forest denudation, it makes a pleasant change to write about a species that has benefited from these processes. Magpies are conveniently described as an 'edge species'. They like open spaces, particularly pasture and lawns, over which they stride confidently, probing with their strong bills for the variety of insect life to be found in the top layers of the soil. Foraging space is not their only requirement; they need substantial trees in which to build their nests, where they can rest in the shade during the day and where they can roost in safety at night. Such a suitable combination of short grassy pasture with a scattering of suitable trees is a fringe benefit of habitat fragmentation that results from agricultural development. It is also a resource sought by many magpies and therefore competed for. Possession has to be defended and magpies in Western Australia have evolved an unusual way of life to achieve this. They live in groups of 4-12 birds consisting of several breeding pairs and the progeny of the past two

Top: Male magpie.
Below: Female magpie.

breeding seasons, most of which remain with the group when they grow up.

The defended territories belonging to the different groups vary in size with the suitability of the habitat. In Kings Park, Perth, 400 ha of bush and lawn supported nine groups of magpies (84 birds; 44 ha per group) in 1938 (Wilson 1945). Elsewhere in Perth, around Guildford, I have been studying 13 groups (80 birds; 17 ha per group) surviving well in suburbia. When Angus Robinson (1956) was developing his dairy farm at Coolup, south of Pinjarra, it supported eight groups (70 birds; 44 ha per group) in 1944 and 13 groups by 1954 (135 birds; 30 ha per group), as forest was cleared and replaced by pasture.

The membership of a magpie group is remarkably constant from year to year and for most of the time there is little discord among the members as they forage within sight of each other, share defence of the territory against intrusion and roost in the same patch of trees. Most groups contain equal numbers of adult males and females with one male dominant to the others should a dispute arise. Although group life is usually harmonious it becomes less so in the spring when the adult pairs are preoccupied with each other and their nests, which may be only 50m apart; non-breeders are careful not to conflict with their elders at this time.

It is not always easy to tell the sex of a magpie, although in WA adult males have backs that are entirely white whereas those of females are patterned black and white (see picture). Confusion over

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EDITORIAL

Greetings everyone!

RECENTLY we've had some articles about salt lakes, well, this issue we feature samphires. If you have ever seen a salt patch (!) you will have noticed these squishy plants, but have you ever really *looked* at them? They are amazingly diverse and unusual, as Paul Wilson's article describes.

Sometimes common fauna is dismissed as not being as interesting as rare species, but this is certainly not true of magpies. They have fascinating individual personalities, like my boss maggie, Bandit, who, in his territorial song, incorporates an accurate imitation of me calling the horse and the horse yelling for his tea! Perhaps Ian Rowley's article will inspire us all to study our maggie mobs more carefully.

Please continue to send interesting observations, queries, practical ideas or suggestions for topics you would like to read about. It seems Pat Barblett's 'Ecotourism' article last issue struck a chord with a large number of readers. Is there any other area where we can help with ideas and networking?

With a couple of years of odd climatic perurbations behind us, best wishes for the coming season.

Penny Hussey

Recently all LFW staff except Volker gathered for a workshop at the LFW property "Rosneath Farm" at Dunsborough. It was a good couple of days (especially the sampling of local plonk!).
L-R: Bob, Heather, Fiona, Anne, Penny, Cherie, Sylvia, Avril, Jenny, Claire.
Photo: Warwick Rowell

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OOPS!

In the last issue, on page 9, the large photo was of *Persoonia saccata*. We apologise for the spelling mistake.

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the sex of immatures arises because all birds less than two years old have mottled black and white backs similar to those of adult females. Fledglings leave the nest with the feathering of the belly a dull black that moults to mottled grey with a brownish tinge within three months. Then and for the next two years the sexes are indistinguishable but their bills give their age away. Adult females (and adult males) have bluish-white bills with a small area of black at the tip; birds in their first year have much darker, leaden coloured bills; those in their second year are lighter coloured with a black tip. Identification of sex is not certain until the immature males show their white backs clearly after their third moult in the February –March of their third year; even then, most retain a few black feathers amongst the white on their backs.

The social structure of a group of magpies is maintained by a variety of calls. The simplest of these is the single note "ka" given at a range of intensities in different situations alerting others to danger, intrusion or annoyance. The tri-syllabic rallying call "kaa.ki.kree" with the middle element short and the last long drawn out is often given in flight as an individual chases an intruder; it tends to gather the members of the group. The begging call of hungry fledglings is familiar to most people and continues over several weeks whenever an adult approaches with food. But it is the carol which is probably the best known vocalisation and which, when given as a coordinated group effort, is one of the most beautiful of birdsongs. Usually given when the group is already gathered together, it may be in response to the completion of a successful territorial

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dispute with a neighbour, the resolution of a within group dispute, or simply as pure "joie de vivre". In succession each member of the group contributes a phrase of song and carolling is probably important in reinforcing social bonding within the group and in the incorporation of young recruits, since fledglings soon begin to try and join in. Another very characteristic song is that of the senior male delivered on his own from a favourite perch, as a territorial and sexual advertisment; it is heard throughout the year except for the summer moult and is given at dawn and dusk – and even in the middle of the night sometimes. As the breeding season approaches this singing provokes response from other neighbouring males.

Nest-building starts in August, and is the responsibility of the breeding female. The choice of a suitable site and the placing of the first twig or two may take several days, but once the base of interlocking twigs is stable the structure grows quickly to the size of a large pudding basin. The female then lines this basket with bark, feathers, bits of wool and other materials that felt to a warm insulated bowl in which the 3-4 eggs are laid. Incubation takes about three weeks and is solely done by the female, who may be fed by the male occasionally, but by and large she has to forage for herself. The pair gets excited as the eggs hatch, both birds bringing small items of food to the naked nestlings, which the female broods when the weather is cool or shades them when hot. When the young feather up (c. 14 days) they

are left more on their own while the pair forages. Very occasionally another male in the group may bring food for the nestlings, especially if his own partner has not bred successfully. Otherwise, the other group members do not help in any way.

Nestlings stay in the nest for about five weeks – a variable time depending on the number of siblings and whether the season has been bountiful in providing insects. This is a time when some males swoop at humans who approach near their nest, particularly small children and people on bicycles. Not all males react in this way and in most cases wearing a hat and carrying a stick to wave above the head is sufficent security. However parents are well advised to take particular care of young children at this time; there are several unfortunate records of damaged eyes due to magpie attack.

Sometimes all the brood leaves at the same time; larger broods tend to spread departure over two or three days. When they leave the nest, fledglings do not fly very well and many land on the ground and are unable to fly up to cover. This is a very vulnerable time for them, and foxes, cats, or dogs may catch and kill them; humans, too, thinking to 'save' the fledgling take them to animal shelters with the best of intentions, breaking the essential parental bonding. After a week, the adults escort the fledgling to another tree where it stays and is fed by both parents. After 2-3 weeks, fledglings will follow their parents to wherever they are feeding and perch nearby, calling repeatedly for food. After a fortnight, the young join the adults on the ground and are fed there and gradually the young birds are introduced to group-living. Where there have been two (or more) successful nesting attempts in the group bedlam reigns with fledglings begging at anyone with food and fighting amongst themselves for the

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TRUFFLES (AND THE FUNGIMAP CONFERENCE)

by Katrina Syme

FOLLOWING the article on Woylies by Mark Garkaklis in the January issue of Western Wildlife, I thought readers would like to hear the latest news on research into Australian truffle-like (hypogeous) fungi.

Most truffle-like fungi are believed to form mycorrhizal associations with plants, but some probably do not (more research is needed, of course). Mycologist Teresa Lebel (Royal Botanic Gardens, Melbourne) is about to publish the description of a new genus closely related to the Agaricaceae, a group of saprophytic fungi which includes the commercially-grown species of mushroom *Agaricus bisporus*. She believes that it is extremely unlikely that this new fungus is mycorrhizal. Following genetic studies, other Australian hypogeous fungi have been found to be related to saprophytic above-ground (epigeous) fungi such as *Protrubera* with *Clathrus*, *Endoptychum* with *Agaricus* and *Montagne* with *Coprinus*.

Because of research on mycophagy in Australian mammals (principally by Andrew Claridge, National Parks and Wildlife Service, NSW) and mycorrhizal associations of native plants (principally by Neale Bougher, CSIRO WA, and overseas investigators) there has been a marked increased in research on our truffle-like fungi during the last decade. The findings are very exciting and funding has allowed truffle expert James Trappe (retired Professor of Mycology, Forest Sciences Department University of Corvallis, Oregon, USA) to spend more than a year here in collaborative work with Dr Claridge, Dr Lebel and other Australian scientists.

In the last decade, 25 genera and some 200 new species of truffle-like fungi have been described. Another 200 are currently being described and it is now estimated that we could have more than 1,200 species. This is in marked contrast to Europe, which has only about 150 species of truffles.

You can hear Australian native truffle specialist Teresa Lebel talking on this subject at the June Fungimap Conference in Denmark. Many other inspiring speakers have agreed to come and they include: Neale Bougher: 'Fungi in remnant woodlands of the Western Australian wheatbelt'; Roger Hilton: 'Cup, saucer and flask fungi'; phycologist Roberta Cowan: 'Fungi in the marine environment' and Richie Robinson: 'Wood-rotting fungi'. The person largely responsible for initiating the Fungimap project, Tom May (Chief Mycologist, Royal Botanic Gardens Melbourne), will be a keynote speaker. New Zealand mycologists Ross Beever and Geoff Ridley will also present talks.

During our workshops, participants will learn how to identify fungi; record characters for herbarium collections and view microscopic features. On field excursions there will be ample opportunity for the discovery of unusual and new species of fungi - so few are named! But by then you will appreciate the enormous difficulties in naming new species, having heard Bettye Rees' talk: 'Fun and games in fungal taxonomy'.

The fungi we find will be labelled and displayed and as well as the workshops and talks, there will be an open forum, a dinner and entertainment. The conference ends on the evening of Tuesday June 26th. (Note that the Conference dates differ slightly from those previously advertised and are from 22-26th June, inclusive).

Numbers are limited, so please register as soon as possible. Brochures are available from:
Conference Organiser
Denmark Environment Centre
PO Box 142
Denmark WA 6333
Ph 08 9848 1644;
08 9848 1293 a/h
Email:
fungidenmarkwa@wn.com.au
Brochure details on the Environment Centre's Webpage:
www.denmarkwa.net.au/~environ

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rewards. Some birds other than the parents may find such an importunate fledgling impossible to resist and will feed it.

Although many fledglings do not survive the hazards of their first year, once they reach adulthood annual survival is good – males at 85%; females at 79%. This means that 20 % of adults have a chance of living for a further ten years, so it is well worthwhile getting to know your local magpie group and to enjoy following their activities throughout the year.

References.

Robinson, A. 1956. The annual reproductory cycle of the magpie, *Gymnhorina dorsalis* Campbell, in south-western Australia. Emu 56, 233-336.

Wilson, H. 1946. The life history of the Western Magpie. Emu 45, 233-244.

Ian Rowley is a retired CSIRO zoologist and bird expert. He has writen numerous books and articles; eg. one which is a mine of fascinating information is "Bird Life" pub. Collins, 1982. He can be contacted on 9279 3820.

RESEARCH

USING HEAT TO BREAK DORMANCY OF WA LEGUME AND NON-LEGUME SPECIES

by Anle Tieu and Kingsley Dixon

Seed dormancy so far.....

SEED dormancy greatly limits the species and number of native plants which can be propagated from seed in Western Australia. The discovery of plant-derived smoke as a dormancy breaking tool greatly boosted the number of species which could be germinated. However, the positive effect of smoke has sometimes been found to be erratic and specific to certain species, as well as ineffective for other species, which have been identified as being deeply dormant (ie. Epacridaceae, *Persoonia*, Cyperaceae and Restionaceae species).

Heat has been used effectively in breaking dormancy largely in legume species and has not extended to non-legume species. Thus an experiment was set up to test the effect of heat, as well as smoke and the combination of heat and smoke in breaking seed dormancy of seven southwestern Australian native species with varying dormancy levels when treated with smoke (Table 1). The temperatures tested were 80, 100 and 120°C lasting 10, 30, 60 mins and 24 h as well as untreated controls. These temperatures represented the level and duration experienced by a buried seed during the passage of fire (80°C for 10 mins) as well as artificially high temperatures, not usually experienced in nature, or lasting for such long periods of time (ie. 100°C for 3 h).

Germination of Anigozanthos manglesii seed following no treatment (top) and heat treatment (100°C for 3h) (bottom).

The results

For most species tested, the influence of heat was higher than smoke alone, and the combination of heat and smoke encouraged slightly higher germination or made no change compared to heat alone. *Anigozanthos manglesii* exhibited the highest response to heat (100°C/3h) by germinating from 0% (control) to 84% with heat. Germination of *Actinotus leucocephalus* seed improved almost three-fold (14.5%) at 100°C for 3h compared to the control, and five-fold (17%) for *Loxocarya striatus* seed at 120°C for 30 mins. The legume species, *Gompholobium marginatum* was also extremely heat responsive with a germination level of 0% (control) compared to 90.7% at 120°C for 30 mins.

For other species, the effect of heat was considerable but lower than smoke, as in the case of *Stylidium affine*, with 2% (control), 70% (following heat at 120°C for 30 mins) and 90% (smoke). For *Sowerbaea laxiflora*, a combination of heat and smoke produced optimal germination from 7% (control) to 15% (120°C for 10 mins).

From these results the application of heat and exposure combinations of 100°C for 3 h and 120°C for 30 minutes, in particular, enhanced germination of several species tested so far. Heat alone was found to replace the requirement for smoke for some of these species. The extreme temperature and time combinations, which do not naturally occur in nature, indicate that the mechanism of dormancy release may be due to a form of accelerated after-ripening, leading to high germination. After-ripening in many Australian native species is the process that occurs during a period of dry storage, ensuring seed does not germinate immediately after it is shed and allows for germination to occur over time, ensuring maximum recruitment.

Implications for revegetation

These findings may directly assist in land rehabilitation schemes by improving the germination levels of seeds in broadcast mixes and to maximise tube stock production. The heat pre-treatment using ovens is simple, fast and clean. It has been shown to be a very effective and consistent dormancy breaking tool in species of the Haemodoraceae family such as *Conostylis* and *Anigozanthos* spp. Further testing of heat treatment in other plant families may lead to an increase in the number of species on the list of heat-responsive species which can be utilised for land rehabilitation programs.

Table 1. List of species tested with high temperature pulses

Germinates well with smoke	Limited benefit from smoke (nursery conditions)
Anigozanthos manglesii (Haemodoraceae)	*Actinotus leucocephalus* (Apiaceae)
Gompholobium knightianum (Fabaceae)	*Loxocarya striatus* (Restionaceae)
Sowerbaea laxiflora (Anthericaceae)	*Schoenus unispiculatus* (Cyperaceae)
Stylidium affine (Stylidiaceae)	

References

Tieu A, Dixon, Meney and Sivasithamparam. 2001. The interaction of heat and smoke for releasing seed dormancy in seven plant species from southwestern Australia. *Annals of Botany*. in press.

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SALACIOUS SAMPHIRES

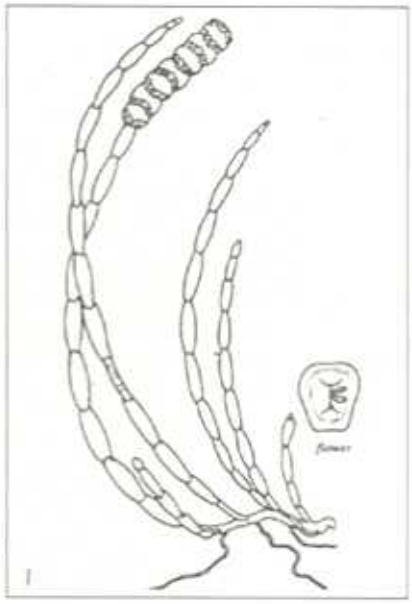
by Paul Wilson

SAMPHIRES do not arouse the degree of affection that is accorded to plants of brighter appearance such as banksias, wattles and the everlastings, but they have their admirers, and even those whose visual appetites are jaded by a surfeit of lovely flowers can appreciate the beauty of a saltpan in the evening light when it is covered with samphires of various shades of green and red; individually they can also be fascinating if time is taken to examine them closely.

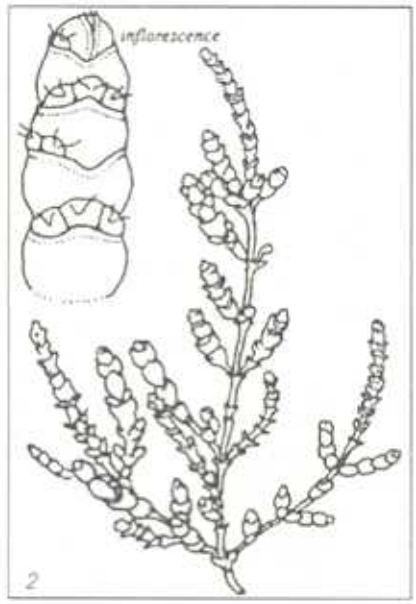
Shakespeare referred to the employment of gathering samphires as a 'dreadful trade', but his remark was directed to the picking of the European plant that inhabits rocky shores, which is a quite different species to the samphires of Australia even though they share the same common name. The word 'samphire' has itself an interesting history. Shakespeare spelt it 'sampire' which is close to the French name '(herbe de) St Pierre', St Peter being the patron saint of fishermen (with reference to the sea coast) and the plant grows among rocks, the 'petros' from which the name Pierre or Peter is derived. In Western Australia the word has taken on a further modification where a roadhouse between Port Hedland and Broome that sits in a huge samphire patch is called the Sandfire Roadhouse.

Another name for these plants is glasswort. This from their use in making glass. The dried plants were burnt and their ashes mixed with sand and fired. Fortunately for samphires this method of glass making is not employed in Australia.

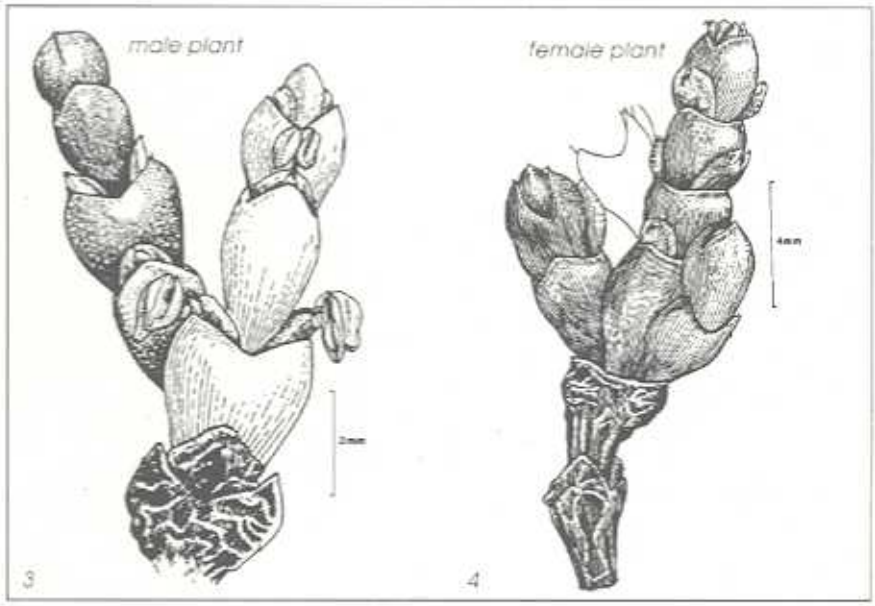
Australian samphires belong to the family Chenopodiaceae, principally to the genus *Halosarcia*. The family includes the beetroot and such native plants as the bluebushes, saltbushes, and goosefoot that are usually found in slightly saline areas. Samphires are also predominantly plants of saline areas as well as estuarine tidal flats but they reach their greatest luxuriance around inland saltlakes.



Sarcocornia. Flowers in groups of 3-7, all fertile, with two stamens. Seeds without perisperm (the food reserve). Three species.



Halosarcia. Flowers in threes, all fertile, with one stamen. Seed with perisperm. 23 species.



Tegicornia. Plants dioecious (male and female flowers on separate plants). Flowers solitary; male flower with one stamen. Seed with perisperm. One species.

Australian species.

In Australia there are 36 named species of samphire, of which all except 4 are found in Western Australia, while several more are

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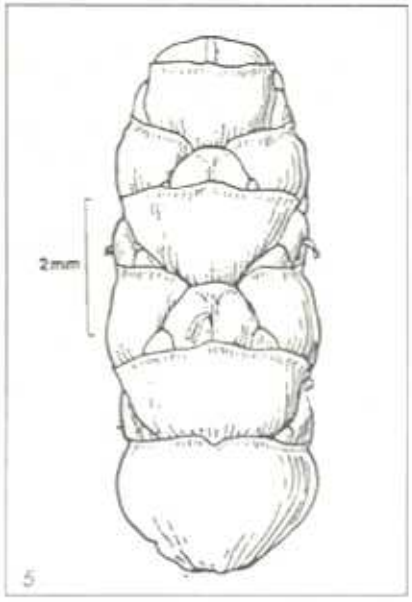
known but have not yet been formally described and, in fact, a very distinct undescribed species was discovered around some salt lakes in the wheatbelt only last year. They are divided into six genera all of which are represented in WA. This State is therefore the home of the samphire since not only does it have more species, and a greater abundance of plants, than are found in any other State, it also has far more species of samphire than in any other country in the world.

The six Australian genera of samphires look superficially similar, although a close examination will indicate some differences, but the principle distinction is in the flowers, fruits, and seeds.

Appearance

Those who have looked closely at samphires will have noticed that the young branches are fleshy and appear to be segmented. At the apex of each segment are a pair of short lobes. The segments are the internodes and the apical lobes are the free portion of the leaves. The lobes fuse at their base, pass down the internode, and surround the stem to form a cylindrical fleshy sheath. Therefore what one sees when looking at a young samphire plant are modified leaves that completely ensheath the branches. This novel leaf-form has the advantage that the surface available for transpiration is much reduced and the products of photosynthesis can be rapidly transferred to the main body of the plant.

The flowers of *Halosarcia* are small and are embedded in the fleshy inflorescence axis in opposite groups of three. The calyx is succulent, there are no petals, and there is only one stamen and a single 1-seeded ovary. In some species the ripe seed falls away from the plant while in others it persists until the branch breaks off and falls to the ground, which may take many years.



Sclerostegia. Flowers in threes, one female flower with a male flower with one stamen united to it on each side. Seed with perisperm. Five species.

One species, *Halosarcia indica*, is found along parts of our tropical coast and also around the coasts of other tropical countries that border the Indian Ocean. It is a prostrate perennial plant that appears to produce only female plants, although it is possible that the male plant is so inconspicuous that it has not been observed. All other species of *Halosarcia* are found only in Australia and their flowers are bisexual.

While *Halosarcia* plants are nearly all adapted to saline habitats, and in most the sap has a high salt content, the closely related genus *Tecticornia* is found in inland fresh-water clay pans, and while *Halosarcia* species are shrubs or herbaceous perennials, *Tecticornia* species are erect annuals or biennials. The flowers of *Tecticornia* are in groups of 3 or 5 in opposite bracts that are free from each other while the calyx consists of two laterally placed succulent sepals that are also free from each other when mature. The ripe seed is relatively large and eventually falls from the inflorescence along with the sepals and bracts.

Pachycornia. Flowers as in Sclerostegia but sunken into a wooden stem. One species. Very rare in WA.

Food value

In Britain the young succulent branch tips of coastal species are still collected and used as a pickle or are cooked and eaten with fish. Charles and Diana are recorded as breakfasting on their wedding day on samphire that was collected from the Crown estates in the Norfolk marshes, but as to what recipe was used, and whether they enjoyed the dish, we do not know.

The fleshy tips of some coastal Australian samphires can be eaten if suitably prepared but for real nourishment one has to turn to the seed. This seed is most easily obtained from *Tecticornia* species, and these, being so rare, are now seldom used for food. However, until quite recently aboriginal groups that had a *Tecticornia* claypan in their territory would gather together when the seed was ripe and hold a corroboree while at the same time living off the samphire crop. They gathered their harvest by using a wooden collecting dish over which they would shake the *Tecticornia* branches and out would come the bracts, sepals and seed. In

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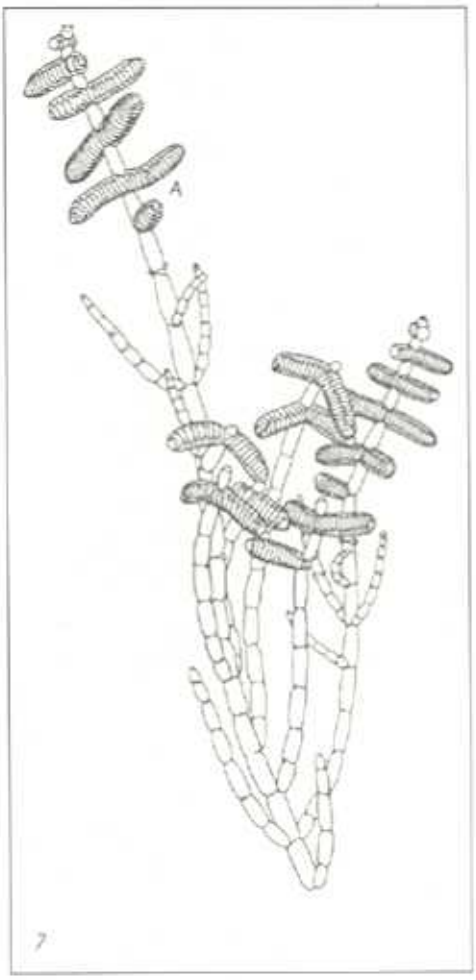
a good year the seed could be gathered in abundance. It would first be winnowed by tossing in a kangaroo skin and then ground to make flour for use in dampers. The seed was considered very good tucker. Since the claypans were so far apart most aboriginal groups were aware of only one population of *Tectornia* and to this they gave a distinctive name. Near Cue the claypan, the plant, and the seed were all referred to as 'bullibulli', and in the Leonora – Laverton area as 'kurami', both of these sites held *Tecticornia arborea* which has a smooth egg-shaped seed. In the Rawlinson Range district *Tecticornia verrucosa* was used where it was called 'mungiba', this has a lens-shaped seed. William Moyle, who visited the Warburton to Rawlinson Range area in 1958 recorded that "the fleshy bulbs containing small seeds are eaten directly from the plant and have a pleasant, slightly salty flavour".

The seeds of many samphires are eaten by birds. The orange-bellied parrot on its annual migration from south-west Tasmania to the coasts of South Australia and Victoria, has as its preferred food source one small remnant patch of *Halosarcia halocnemoides* in Pt Phillip Bay. Unfortunately the patch is on land owned by a chemical company which may wish to extend its activities into the samphires. In WA the hard fruits of several *Sclerostegia* species are eaten by parrots, and probably by other birds. In fact the fruit of *Sclerostegia disarticulata* is particularly adapted for bird consumption since it can be freely removed from the spike when ripe.

Cultivation

In Mexico, California, Kuwait, and Saudi Arabia experimental plantations of samphires are currently the vogue since their cultivation does not require fresh water. The samphires are planted in fields similar to the manner in which rice is grown but they are irrigated with sea water. The whole plant can be harvested for hay or the crop can be first threshed and the seed crushed for its oil. If used for hay, since it has a high salt content, it is first passed through rollers which squeeze out the salty sap before being dried and fed to stock. Similar experimental plantations are to be found in Victoria where some of our native species are being tested. At this stage it would appear that the total cost of producing samphire hay, which includes irrigation with sea-water, harvesting, and crushing, does not compare favourably with the cost of making conventional hay, although the protein content of samphire hay (with the included seed) is higher.



Tecticornia. *Flowers in threes or fives; sepals 2, laterally placed; stamen one. Bracts free from each other. Seed with perisperm. One species.*

Salinisation

One's first assumption is that with the increasing salinisation of our wheatbelt lands the samphire population will expand, and while this is probably correct it only applies to a few species. Most of our samphire species appear to occupy rather narrow ecological niches and they are not able to withstand a surge in salt content of the soil. This may result in the loss of several species and the concomitant extinction of other life forms that occupy the same environments.

When you next pass a samphire patch take time to look at the plants, study the flowers, see how many different species are present, observe where they grow in relation to each other, and find out which genera they represent. If you persist, in time you also will become a lover of samphires, and the title of this article may then be appropriate.

Paul Wilson is a consultant botanist at the Herbarium. He specialises in the taxonomy of Chenopodiaceae, Asteraceae and Rutaceae, among others. He can be contacted on ph. 9334 0509.

***Illustrations**: 1 & 2 by Margaret Wilson from 'Native vegetation of estuaries and saline waterways in south Western Australia'. 1997. WRC. 3, 4, 5 & 6 by Margaret Menadue or Bryony Wilson from 'A revision of the Australian species of Salicornieae (Chenopodiaceae)'. 1980. Nuytsia, 3. CALM. 7 by Margaret Menadue from 'Flora of Australia' Vol 4. 1984. AGPS.*

PRACTICALITIES

MANAGEMENT OF HILLS FIREBREAKS

by
Herbert Titelius

OVER the last 25 years I have managed fire access tracks on a number of private landholders' properties including our own (of 6 ha) in the Shire of Mundaring. In that time, the appreciation of native plants and the ecosystem services they provide has extended to the recognition of the erosion control role some of them can play on firebreaks in hilly areas. 'Firebreak management' is now for me an essential part of long-term bushland regeneration and management.

Where once I aimed to remove all vestiges of vegetation from the firebreak, I now use selective pressure to foster the survival of small native plants there. These include our native grasses: eg. *Neurachne alopecuroidea*, Foxtail Mulga Grass; *Amphipogon debilis*, Greybeard Grass; *Microlaena stipoides*, Weeping Grass; and *Tetrarrhena laevis*, Forest Ricegrass. Others include small, grass-like plants such as *Laxmannia squarrosa*, Pin-cushion Grass, small triggerplants, *Stylidium* spp., and *Conostylis* spp. such as *C. setigera*, *C. setosa* and *C. caricina*. If it is native, small and evergreen, or is eaten down by kangaroos, then it can be managed for the purpose of holding soils on hillside firebreaks.

The chosen species do not included dense sedges such as *Mesomelaena stygia* or *Tetraria octandra*, or bulky shrubs which are too difficult to manage to keep low on firebreaks. These can be removed by spot spraying of a Glyphosate-based herbicide and a brushcutter and rake when the firebreaks are mowed over at the end of November each year. Alternatively they can be transplanted, with a generous clod of soil attached, in early winter, preferably while it is raining to minimise stress due to drying of roots. Even fairly sensitive plants such as *Isopogon dubius* and *Grevillea bipinnatifida* have good survival rates (in the order of 80%) when treated carefully, and are an invaluable ready-made resource for assisting in regeneration in degraded areas elsewhere on your property. Care needs to be taken, of course, to ensure that dieback is not active in the areas you are taking the plants from.

Opercularia vaginata

I am assisted in my annual mowing of the firebreaks by a combination of rabbits and kangaroos that are particularly partial to my favourite native grass, Foxtail Mulga Grass. Fortunately, on our place it is mainly the kangaroos that act as live-in firebreak mowers. Another edible firebreak plant appears to be *Opercularia vaginata*, which has a tendency to grow into a mat. The less delectable grasses such as Greybeard Grass and Forest Ricegrass will require active management using a brushcutter. Over time the chosen plants will colonise the firebreak from seed heads left to develop to maturity. With artificial selection pressures a firebreak can be made into a low maintenance disturbance area with its customised native plant community.

To assist in soil stabilisation on firebreaks I also use erosion control trenches to harvest water in a controlled manner off into adjacent bushland at 5 to 10 m intervals down a hillside. Where there is only infrequent foot traffic, then trenches to a depth of about 15 cm are sufficient if they are angled at about 60° to the line of maximum slope. The optimum trench slope is one where the silt deposition is matched by the silt removed by erosion and deposition beyond the end of the trench.

The actual soil conditions on a property will require a little experimentation with the general orientation of the trenches to ensure that they neither silt up too frequently nor develop into a gully. Care is also needed to ensure that soil from dieback areas is not carried to dieback-free areas on your property. This risk is minimised if the trenches are made when the soil is dry.

Trenches can be made by hand, using mattock and spade. Alternatively, a tractor-mounted scraper blade can be used to trench and mound. Follow up work with hand tools may be required to firm down the soil of the mounds and to carry the lower end of the trench into nearby bushland to ensure that the water harvest infiltrates into the soil to benefit plants. The size of your land-holding will also influence how far you will want to go to minimise transient damage to bushland from your erosion-control trench construction.

With the above-described firebreak system in place for a couple of years the maintenance effort required is low and can provide a side benefit of feed to native fauna such as Brush Wallabies and Grey Kangaroos. The system provides a better balance between the risk of fire damage to bushland and built structures, and the certainty of erosion and water-course degradation, than rigidly following the bare, mineral-earth recommendation for firebreaks.

Herbert Titelius is a wildflower enthusiast and a member of the Australian Association of Bush Regenerators (AABR). He can be contacted on (08) 9298 8218.

PRACTICALITIES

DESIGNING WINDBREAKS TO TRAP BLOWING WEED SEEDS

THERE is little more infuriating than keeping your own property weed-free, while annually a new crop of weeds blow in from your neighbours'! Whether you are concerned about access of weeds to paddocks or bushland, windbreaks can help.

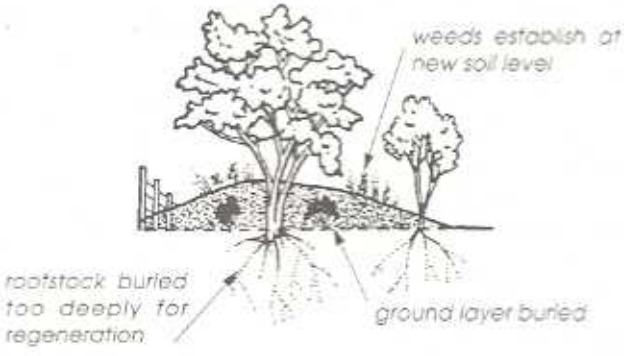
If you doubt this, look at road verges in windy areas. It is a sad fact that the original soil profile - and so capacity to regenerate - on many sandplain roadsides is buried under layers of deposited soil, seed, straw and dung blown off adjacent paddocks and dropped when the wind slows as it hits the verge. This deposited mess is non-wetting, too, which compounds the degradation.

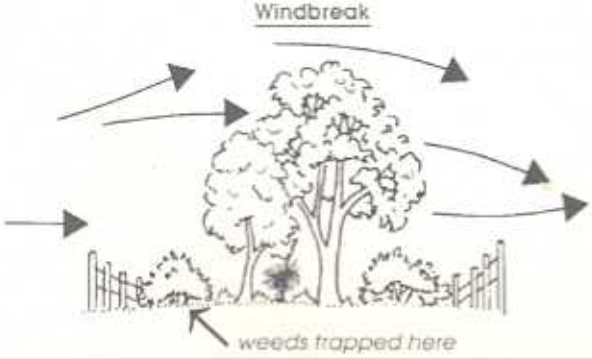
So, if you are designing a successful weed barrier, ensure that it has lots of vegetation and lower foliage for the weed seeds to get caught up in. This means that tree lines grazed by stock are not good weed barriers, as the weeds (often whole plants, eg radish) simply bowl along underneath. In fact, such strips may become wind tunnels, increasing wind speed and accelerating erosion.

Windbreaks, of course, do more than just trap weed seeds. By raising wind off the ground, they provide shelter for adjoining land - the effective distance depends on the height of the plants making up the windbreak.

Windbreaks should not be a solid barrier (as might be created, eg, by lines of even-aged pine trees), as this can create turbulence. A permeable barrier, with species of different heights and form, will filter the wind. A mixture of trees, mallees and shrubs should be aimed for. Make them as wide as your property planning and space available allows.

Effects of wind-blown debris deposition in remnant vegetation





WINDBREAKS ARE WORTH CREATING!

IN 1996, when Muriel White purchased her property at Byford she had to contend with a severe wind erosion problem which had created a blowout 30 cm deep along a fenceline. Her solution was to place logs along the fenceline to prevent further erosion and to plant mixed trees and shrubs inside old tyres with a generous helping of horse manure underneath. A parallel row of fencing was added to prevent horses from eating the growing plants. Within 2 years the trees were several metres high. Today, after nearly 5 years, the plants are more than 6 metres tall creating an effective windbreak, stabilising the soil and providing habitat for birds.

Claire Hall

Summer 1996, windswept, eroded fenceline

Winter 1998, young trees up to 2 m tall

Summer 2001, good windbreak with lots of shelter for the horse (photos: M. White)

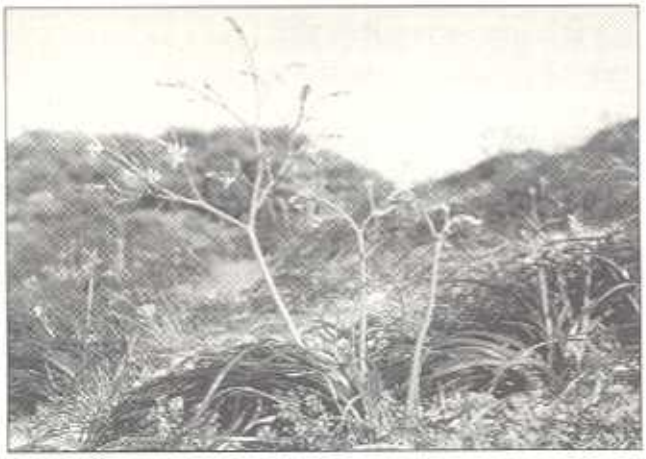
WEED ALERT

DUNE ONION WEED KILLS HORSES

EVERY year horses paddocked on the coastal plain north and south of Perth die from eating Dune Onion Weed, *Trachyandra divaricata*. In bush or paddock, this is definitely one to eradicate.

Dune Onion Weed is a South African species with dense clumps of flattened leaves, widely branching flower stalks and small white flowers often with yellow spots near their base. It occurs throughout the lower southwest from Geraldton to Albany, especially close to the coast on calcareous sandy soils. (A similar plant from the Mediterranean, Onion Weed, *Asphodelus fistulosus*, has less branched stalks and flowers with a brown stripe in the centre. It is very widespread from Exmouth to Eucla and is rapidly invading arid pastoral areas. It is not known to be toxic.) Neither plant actually smells of onions.

Both plants are invasive weeds, spreading rapidly by seed. In bushland they outcompete local species, especially in immediate post-fire regeneration. In overgrazed sandy paddocks they can come to dominate the ground layer. In summer, if there is no other feed for the animals so that they are forced to graze the *Trachyandra*, it can be fatal. It is toxic to all stock, but horses are thought to be the most susceptible. It is not known whether native species, such as roos or tammars, eat it, but if they do, it probably has a similar effect.



Dune Onion Weed, *Trachyandra divaricata*

Onion Weed, *Asphodelus fistulosus*

AGWEST Veterinary Toxicologist Jeremy Allen says: "Affected animals show a stiff, stumbling, uncoordinated gait, with tremors and excessive sweating. This progresses to partial paralysis affecting muscular ability but not sensation, and the animal goes down onto the sternum. Death eventually occurs from starvation, dehydration or complications resulting from the paralysis. It may take from 1-3 months from the first signs to sternal recumbency.

"If the condition is detected very early then it can be reversed by removing access to the plant. However, in most cases it is noticed too late. When this happens you either get only partial recovery - with a horse this could be dangerous - or the disease just progresses to the terminal stages. The equine vets at Murdoch have a lot of experience with this disease and can quickly tell if it has progressed too far for an animal to recover."

The best cure is prevention!

(1) Remove all *Trachyandra* from your property. Spot spraying with Ally/Brushoff in summer/autumn at 5gm/ha for 2 years gives 100% control.

(2) Ensure that your stock have plenty to eat so that they are not forced to graze *Trachyandra*.

Penny Hussey

INCREASED FUNDING FOR WEED MANAGEMENT

The Federal Government recently announced funding for a Cooperative Research Centre for Australian Weed Management, which will continue the good work of the current CRC for Weed Management Systems through to 2008. The CRCAWM will be working to reduce the risks to the environment, agriculture and rural sectors all across Australia, from currently established weed species as well as increasing numbers of newly invading weeds.

CRCAWM is designed to attack the challenge in three ways:

1 Reduce the influx of new weeds and more effectively manage weed incursions already established in the country.

2 Devise innovative methods and strategies to integrate weed management that reduces costs and improves agricultural sustainability.

3 Protect the integrity of Australia's landscapes and natural ecosystems through the use of multi-disciplinary approaches.

For more information, contact Rick Roush
email: crcweeds@waite.adelaide.edu.au

WEED ALERT

THE CALM HERBARIUM'S WEED INFORMATION NETWORK (WIN)

This project, to form an effective Network to document the weeds of WA, is a basic need for the development of National, State and local weed strategies. The ongoing documentation of the current impacts of weeds in local areas and the subsequent development of management strategies is of the highest priority in conserving Western Australia's high biodiversity.

Because there has not been a concerted effort to document the weeds of WA, botanists, ecologists and Landcare and related community groups cannot answer the following questions: -

- What particular weed species are naturalised in WA or in their district?
- In which precise locations have they been recorded and what are their habitat preferences?
- What is their potential spread?
- What are the biological attributes that may be critical to successful control or management?

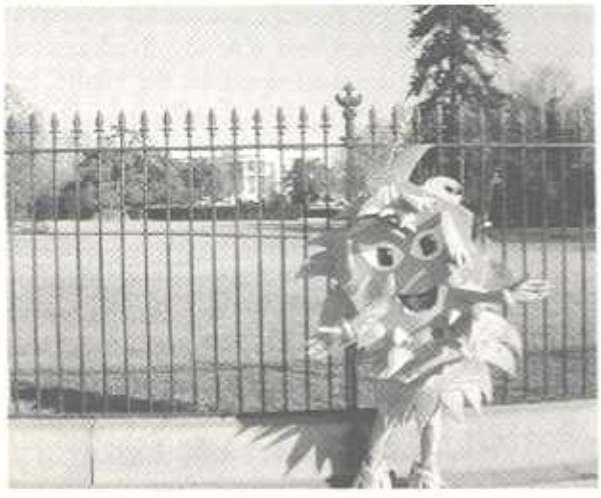
The WIN Project seeks to gather answers to these questions by developing partnerships between the CALM Herbarium and collaborating local community groups. The data gathered will be made available to all stakeholders through Internet and other means.

Detailed information, including how you can be involved, will be provided in the next issue of Western Wildlife, in time for the most important collecting season.

Neville Marchant, CALM Herbarium.

WOODY WEED GOES STATESIDE!

That rampaging rascal Woody Weed is visiting the United States! Here he is capering around outside the White House, warning people of the dangers of invasive species. Is he a good Oz export?!



PRACTICALITIES

MAKE YOUR OWN CAT TRAP

by Heather Adamson

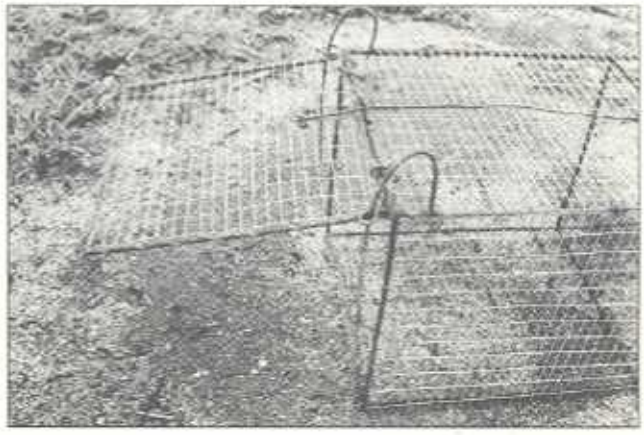
Construction

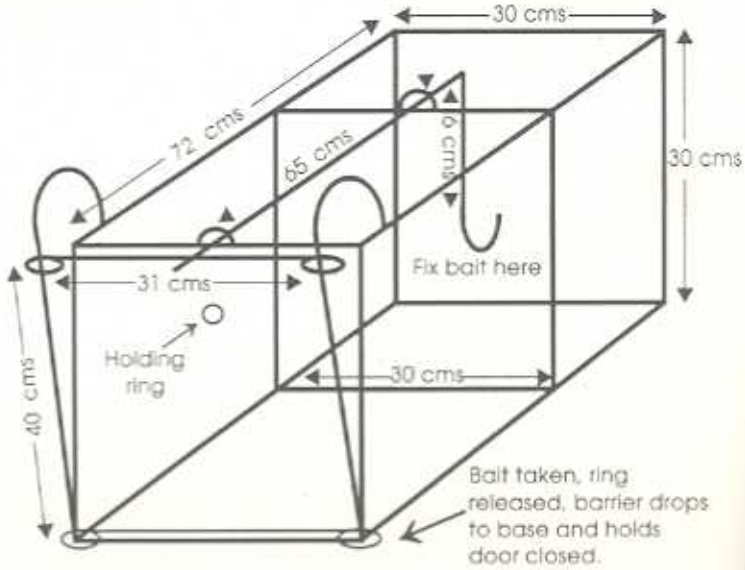
1 Make frame using steel rod or small angle iron welded together - dimensions shown
2 Door is 28cm x 28 cm, attached with twitched fencing wire
3 Cut aviary wire to size of frame and lace on with soft wire
4 Use fencing wire as the hook and a 'barrier' to drop down when the door falls shut
5 Small ring over the end of the fencing wire holds the door open

Action

6 Set trap on totally flat surface
7 Fix fresh meat to hook (chicken necks are ideal)
8 Change daily
9 As soon as bait moved by cat, door drops automatically and barrier secures door shut.

Humanely dispose of any feral cat caught.





ECONOMIC ASPECTS OF BIODIVERSITY

SANDALWOOD - A TREE CROP FOR THE FUTURE

MICHAEL CUSACK has a passion for sandalwood. When he needed to replace the fence around his *Land For Wildlife* site at Moodiarup, it was suggested that he plant a buffer between the bush and farmland to prevent fertiliser and pasture seeds contaminating the edges of the bush. Michael saw this as a great opportunity to create a woodlot for the future using local timber species.

Soil types vary in the 33 m wide by 950 m long buffer from gravelly soils in upland areas to heavier loams on lower slopes. The average rainfall is 550 mm per year.

Knowing good weed control was crucial, Michael sprayed the site with simazine and Roundup® in the spring of 1998 to prevent seed set. The following year after the break of season he ripped the site with a bulldozer and sprayed again. The riplines were 4 m apart.

Michael then planted jam wattle seedlings *(Acacia acuminata)* 4 metres apart along the riplines to act as a host for the hemiparasitic sandalwood trees.

When the jam trees were one year old, four sandalwood seeds were sown 50 cm away from each jam tree (two each side of the tree) and within the ripline. The untreated seeds were planted in April and started germinating with the first rains in the warm soil.

To improve the buffering aspect of the woodlot, Michael cultivated in between the riplines and direct seeded understorey species with seed collected from the adjacent bush. Even in the dry year of 2000, prickly Moses (*Acacia pulchella*), jam (*Acacia acuminata*), one-sided bottlebrush (*Calothamnus quadrifidus*), honey bush (*Hakea lissocarpha*) and harsh hakea (*Hakea prostrata*) have germinated.

Weed control is good on the gravelly soils, although still a problem in heavier soils.

Michael is concerned that the jam trees at one year old may be killed by the sandalwood seedlings. Not all the sandalwood seeds have germinated, those that have not germinated in 2001 will be resown.

Michael believes he did things the hard way. "Good weed control is crucial. I would have been better cleaning up the area for two years in a row, then direct seeding the whole site with a mixture of understorey species including the all important jam trees. When the jam trees were two years old, I would plant the sandalwood seeds next to the strongest hosts.

"If you want to plant sandalwood seeds you have got to start fours years ahead. Two years for weed control, two years to let the host plants become established and then plant your seed."

Already Michael is learning from his work and there are still more questions to be answered. Will there be enough sandalwood trees to make a profitable venture? Are there enough hosts to enable the sandalwood to reach maturity? Will the jam trees reach maturity and provide timber or will they be killed by the sandalwood? Will the woody vegetation out-compete the weeds and provide a good buffer?

Michael's passion for sandalwood may provide us with some of the answers.

Avril Baxter

Sandalwood hosted on to a jam tree. Understorey seed collected from the adjacent bush has been direct seeded between the rows of the 'production trees'.

BUSH DETECTIVE

Who's poo?

And what's the large thing contained in it?

As you can see from the fruits, this photo was taken in jarrah forest. The scat is full of seeds. Who made it, and what is the big lump?

Ans. An emu. The large lump is a zamia seed - manus is digestive outer coating. Amazing that anything, even an emu, could swallow a zamia nut whole!

ECONOMIC ASPECTS OF BIODIVERSITY

WATTLE PANCAKES FOR LUNCH

Acacia victoriae

Seed collection: Pods light brown in colour when mature, in spring or early summer - exact time variable according to weather. Rake from bush onto tarpaulin on ground. Store in a cool, dry place.

Propagation: Sow soon after first good rains. Pour boiling water over seeds, let stand for 2-3 hours. Drain. Best sown as soon as possible thereafter.

Fauna value: Prickly, so excellent shrub for birds to nest in. Many insects attracted to flowers. Seed crop valued by seed-eating birds.

WHEN planning your reveg, why not incorporate some rows of wattles specifically to produce good seed crops? Not only can you use the seeds for future reveg, you may also be able to eat them yourself ...

Seeds from plants that have N-fixing capabilities - eg peas, beans, chickpeas, groundnuts, lentils - have long been known to contribute much-needed protein to human diet. Wattle seeds are similarly high in protein, and there is growing interest in the investigation of their potential as a human food.

Because early european settlers preferred the familiar food plants that they brought with them, there was little attempt to record which plants the Aboriginal people ate, so much knowledge was lost. However, what is known has been gathered into the book "Edible Wattle Seeds of Southern Australia" by Maslin et al (see New Books section in WW 2/4).

One of the best bets is *Acacia victoriae*, Bardi Bush. It is widespread in the arid and semi-arid areas of Australia, on loam and clay-loam, coming as far as the northeastern edge of the wheatbelt. It forms an open, somewhat prickly shrub which flowers in late spring, producing abundant seed crops in early summer. In the rangelands, sheep (and goats) readily browse the flowers and young foliage, which have a protein content of 12% and digestibility of 48%. The seeds were an important source of food for aborigines. The green pods were roasted lightly and the seeds eaten or the mature seeds were ground and mixed with water to make a paste. You could use this as a dip, rather like homus.

'Bush tucker' foods are gaining in popularity, and already have a small niche market in Australia. Planting some rows of potential bush tucker wattles will not only achieve your landcare, water use and fauna habitat objectives, along with some emergency forage, it could also give you a head start into a new industry as it develops. One would expect that arid zone plants, planted along, say, creeklines in the dryer agricutural area, would do very well.

Why not give it a go?

Illustration from "What Seed is That?" by Neville Bonney. Greening Australia, South Australia, 1994.

IN BRIEF

COARSE TEATREE NAMED

In April 2000 (WW 4/2) Chris Robinson wrote about the potential of essential oil derived from a South Coast species called by wildflower pickers 'Coarse Teatree'. It has now been given a scientific name, *Agonis fragrans*, from the beautiful scent of its foliage and oil.

Ref: J.R. Wheeler, N.G. Marchant and C.J. Robinson. 2001. *Agonis fragrans* (Myrtaceae), a new species from Western Australia. Nuytsia **13**(3):567-570.

SMOKE FOR BROAD-SCALE APPLICATION

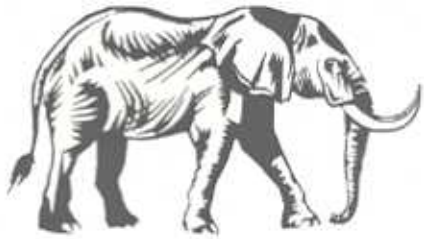
SINCE the discovery that smoke stimulates the germination of many seeds, there has been great interest in how it can be used within existing remnant vegetation to stimulate the soil seed bank and so lead to recovery of understorey species. A recent paper looks at the practicalities and effectiveness of different forms of smoke treatment in the field.

Most effective is the actual aerosol smoke generated by burning plant material, however, it is totally impractical for use on a large scale. Smoked water (made by bubbling aerosol smoke through water) is excellent for treatment of seeds prior to sowing, but requires huge amounts (10,000 kg/ha) to be effective in the field. Concentrated smoke products (CSP) however, look promising for broad-scale use.

CSPs are produced commercially to flavour food. It was found that they will stimulate soil seed bank germination, and it is suggested that use of this material will be both practical and economic within bushland; for example, to infill gaps within existing, degraded remnant vegetation.

Ref: M.V. Lloyd, K.W. Dixon and K. Sivasithamparam. 2000. Comparative effects of different smoke treatments on germination of Australian native plants. Austral Ecology **25**, 610-615.

LFW GOES INTERNATIONAL?



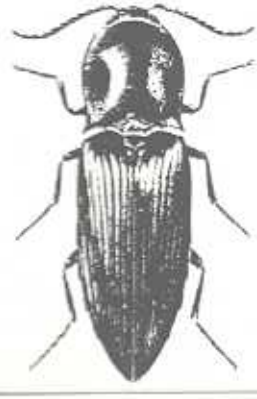
Recently we received an application from a Mr M. Sadzi, of Buhera, Zimbabwe, to register 8 ha of land! It was on the correct application form, too - how did it get there? Are *LFWers* on holiday shedding forms as they go? The Editor regrets that, though she looked very hard, she was unable to find enough funds to fly over there and do an assessment!

LFW in Victoria has had a visit from Indian conservation scientists, who are seriously looking at introducing a similar type of scheme in India!

?

DID YOU KNOW ?

that Click Beetles can propel themselves into the air more than 100 times their own height? On their underside they have a stiff rod which fits into a hollow and acts like a spring. When the beetle is disturbed it arches its body and so releases the spring. The force throws the beetle in the air and makes a loud click, presumably to deter predators.



LFW NEWS

GREEN CORPS SOUTH COAST BIODIVERSITY PROTECTION PROJECT

IN December, a new team of ten young, enthusiastic landcare trainees has begun work on some of the south coast *Land for Wildlife* properties as part of their six month Landcare Traineeship. Members of the Green Corps team receive formal training from the Certificate 11 in Land Conservation and Restoration. Their field activities will include:

- building nest boxes
- building a bridge over a wetland area as part of a nature trail
- seed collecting for provenance revegetation
- fencing off remnant bushlands
- weeding
- sedge and rush propagation
- small mammal fauna surveying
- recording bird sightings for the Bird Atlas project
- water testing and invertebrate surveying in wetlands
- flora surveying.

By the end of the course the trainees will have developed good field observation skills and gained a more in-depth understanding of complex ecology in the south coast landscape. They will also have had the unique opportunity to work on some very special *LFW* properties with a diverse range of vegetation habitats extending from the south coastal fringes inland to the Stirling Ranges and north east to the southern Wheatbelt. It is a cooperative project between different conservation programmes bringing benefits to all parties. The group will also do works for the CALM Macro Corridor project, Water and Rivers Commission, Coastcare, Shire of Denmark and many other community and agency groups. Having to work over the summer months will test the stamina of the 'Green Corps Hard Corps', as they like to be known.

Good luck to the group and thank you to all the *LFW* members who responded with 'on ground' projects.

Sylvia Leighton

Team leader David McNamara, surrounded by ten muddy trainees after spending an afternoon making mud bricks at the Wollery Community Farm, west of Denmark. As part of the Ecoskills 1 Unit, the group learnt about solar passive house design from community resident John Piercey (far left in front row).

LFW NEWS

ROCK ON!

ONCE again, *LFW* and Greenskills' 'Urban Reserves Project' combined to coordinate an environmental management workshop, this time 'managing granite outcrops', publicised under the catchy title 'Rock On!'

The two-day workshop was held last December, the first day in Albany, the second in Denmark. Various speakers talked about all aspects of the sites, from geology, to mosses and fungi, larger plants and how they survive, the fauna, and also a world-wide view of granites and their unique ecology. Since Mt Clarence had been burnt out just three days before our field trip, we got a first hand experience of the impact of fire. It was fascinating to see the pattern of fire across the rocks, and how some species of plants and animals had survived, while others had been destroyed by the heat.

The Denmark field site, on Prof. John Pate's property, was quite a contrast, as we wound our way down a steep valley track under Karri forest to emerge on top of sheet granite outcrops and then edge alongside a feature similar to Wave Rock. It was a privilege for all participants to experience the diversity of the property and be swept up with John's passion and intimate knowledge of the different physiological features of the plant species found in the granite habitat. We also saw how the fauna habitats can vary, some lizards, eg, live under rock on rock, while other species live under rock on soil. Fascinating!

Steve Hopper sharing his in-depth knowledge of granite ecology on Mt Clarence, Albany.

Management issues were also discussed. It appears that weeds are the biggest problem, with 20% of the flora of the granite outcrops in the south-west being weeds. So the south coast community will continue to 'rock on' and try to apply some of our new found knowledge in maintaining our unique granite habitats.

Sylvia Leighton

?

LOST!

LFW sign no 346 has gone walkabout from the gate of Lot 15, Eden Road, Nullaki Peninsula, Young's Siding. If you should spot it anywhere, please return it to Sylvia Leighton at the CALM office, Albany.

Would you be interested in buying a nest box?

A *LFW* member is thinking of starting a small business making nest boxes. If you haven't made your own, and would consider buying some, could you let *LFW* know? Ring 9334 0530.

MEMBER'S PAGE

REGENERATION OF SNOTTYGOBBLES

THE two large Snottygobbles, *Persoonia elliptica* and *P. longifolia*, are quite common throughout the forested area of the south-west, but seedlings are seldom seen. It was thought that bushfire smoke might be the trigger, but still, in the jarrah forest, there are few young plants.

Rod Stone, of Gidgegannup, was interested to note a *P. elliptica* seedling growing well away from a parent tree *underneath the possum feeding tray.* When he checked the large old trees on the block, he found ample evidence that possums were climbing them, and eating the seeds. Then the clincher - nearby, in a scatter of partly decomposed possum droppings, a number of Snottygobble seedlings!

Thanks for this observation, Rod. You may have found another piece of the jigsaw. Could anyone else please check around and see if you can corroborate this relationship?

(Nb: for a method of growing Snottygobble cuttings, see WW 4/1.)

Ringtail Possum

if you go where Perup is moonfull
scrunchings round midnight will pull
you into pricklings of hakea
where you and the feasters are all
held by the moon-darkened branches

the ones who live here
- like monkeys - like lemurs
are bred of another dreaming
staccato surroundings

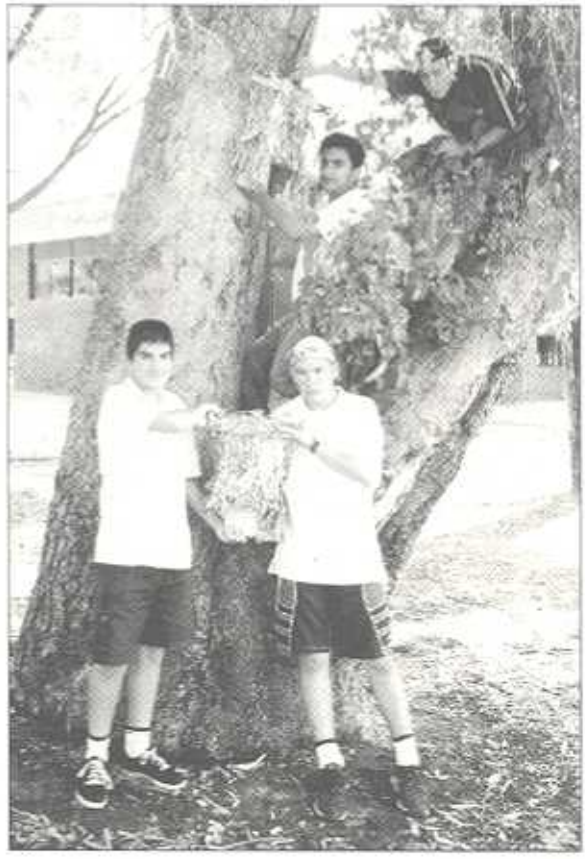
you must wait for your light-seeking eyes
to transmit slow-moving shadows
to link sound to visuals

the nearest turns two mini moons
sees you sees a stranger
instant deepfreeze
glazes eyes quells every hair
turns his distinctive ringtail
to an indistinct stick whose white
could be stripped branch moonlit

now that you see him
the ringtail believes in
invisibility utterly

while you stay as still as you can
in your willing him back into motion
he is
still as your photo

Jenny de Garis
Perup Forest Reserve in May



BAT BOXES FOR BANNISTER CREEK

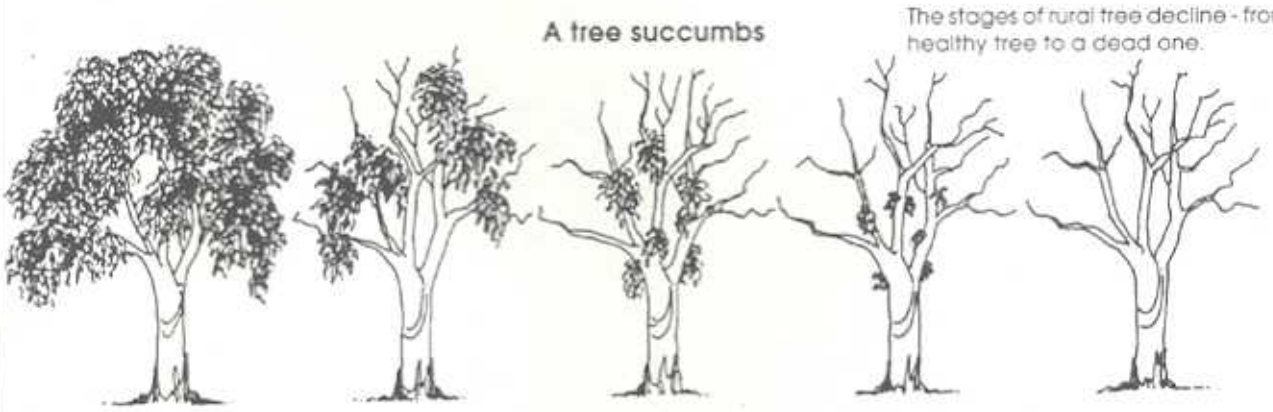
It was reported in the last issue of Western Wildlife that bats are still using Bannister Creek, but that their roosting sites were now getting scarce. The Manual Arts department of Lynwood SHS decided to create some bat boxes for the Bannister Creek C.Gp. to install. Demonstrating the boxes, magnificently camouglaged with paperbark strips, are four of the students: Daniel Maclean, Louis Levissianons, Dean Burgess and Stephen D'Monte. The boxes have now been installed, let's hope the bats like them! Congratulations and thanks to the school and the students.

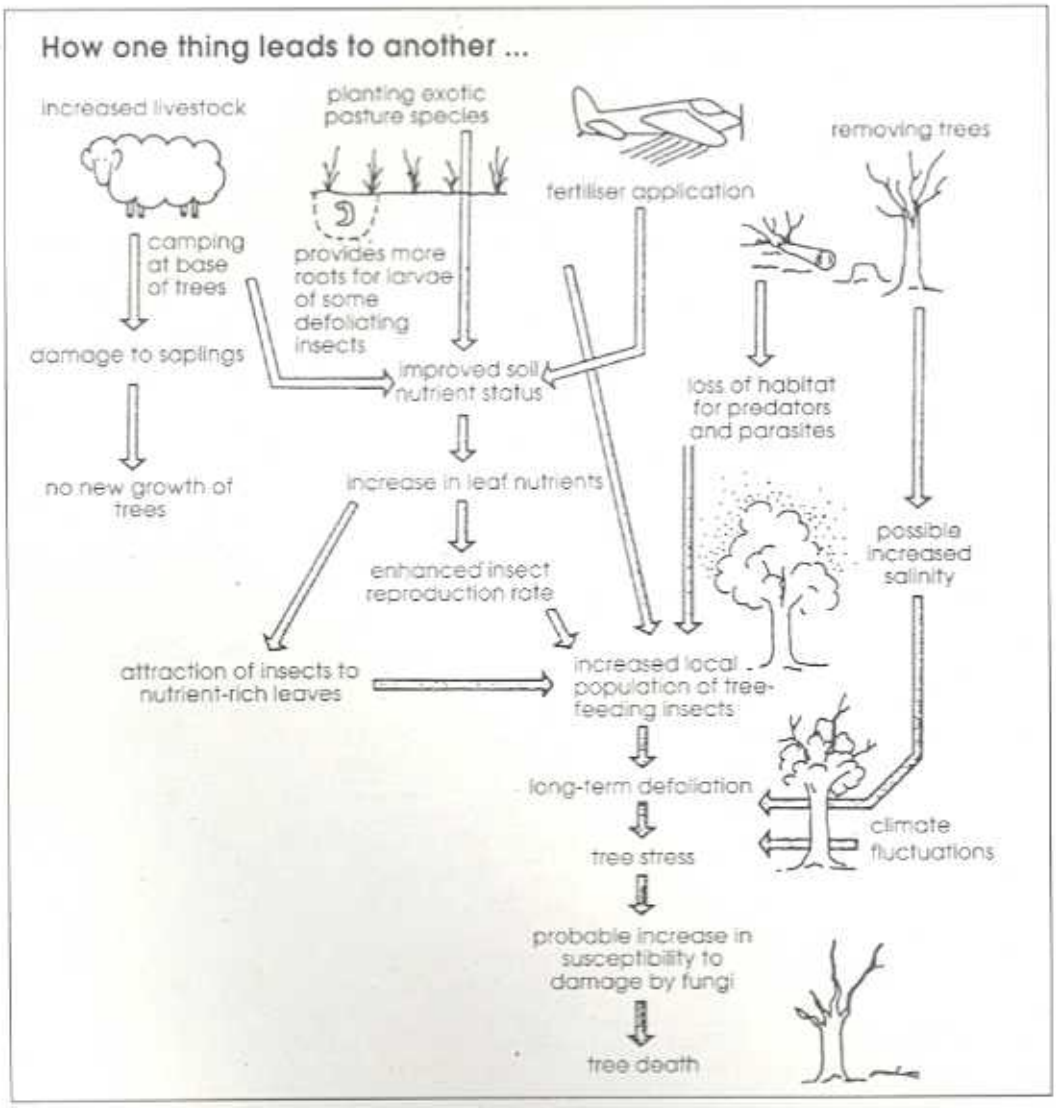
Georgia Davies - Bannister Creek CG

ECONOMIC ASPECTS OF BIODIVERSITY

RURAL TREE DIEBACK

As we prepare for the new growing season, it is appropriate to reflect on the multiplicity of factors which together result in tree decline. These diagrams were published in Ecos in 1989 and are still relevant today.





Are any of these factors impacting on your trees?
Are there any management techniques you could use to mitigate them?

NEW BOOKS

'On the Blackwood: a Guide to the Blackwood River, Bridgetown to Nannup'

$10.00 + p&h
Blackwood Environment Society

A team of writers, photographers and artists has put together this very attractive small book which describes the environment along one section of the Blackwood Valley. It gives an overview of human activity, lots of details about flora and fauna - both land and river - and also descriptions of picnic sites and attractive walks based on them. Either as a resident, or as a visitor to the south west, this book will increase your knowledge and so your appreciation on the region.
Contact: Jenny Dewing, 9761 2318.

Lost Your Block

The origins of WA's forest block names

$35.00 + $7.00 p&h
John Sclater ph: 9592 2090

This is a fascinating book about the geography, history and people of WA forests. The subtitle, "the origins of WA's forest block names" touches only the surface. The names serve as a springboard for a superb collection of bush yarns, forestry lore and human-interest stories.
The "forest blocks" are the subdivisions early foresters created to identify specific areas of native forest and plantations. The names derive from pioneer settlers and bushmen, European connections, Aboriginal language and wildlife. Around each block, a local folklore has evolved, and this has been brilliantly captured.
John Sclater is a retired forester, who worked in WA for 31 years. He has researched his subject meticulously, and writes with historical assurance and wit.

COMING EVENTS

Fungimap Conference - Denmark

Note change of date. Now 22nd to 26th June
More details on p4

Acacia Symposium - Dalwallinu

13th - 14th July
All about wattles - commercial uses, nature conservation, identification and biology - this symposium will be especially interesting to land managers in lower rainfall areas.
For further information, costs and registration, contact Shire of Dalwallinu
Ph: 9661 1001 fax: 9661 1097
Email: dallyshire@wn.com.au
Website: www.dalwallinu.wa.gov.au

Wildflower Walk - Calingiri

Sunday 26th August
Learn more about the beautiful bushland, share billy tea and damper, and enjoy a day out in a wonderful place! The Victoria Plains Tourism Association's popular annual event is scheduled for the Rica Ericson Reserve and Wyening again. Come and join us!
For further information, phone Linda Auburn: 9628 7029 or Betty Wemm: 9628 7121.

State Landcare Conference: 'Partnerships and Diversity'

11th - 14th September 2001
Mandurah Performing Arts Centre
For further info: contact your CLC or email: keynote@ca.com.au

Weedbuster Week

7th - 14th October
What will YOU be doing?

Dowerin Field Days

28th - 30th August

Newdegate Show

5th - 6th September

Symposium 'Fire in South-Western Australian Ecosystems: Impacts and Management'

12th - 13th September 2001
Notre Dame University, Fremantle
If you are interested in fire management in WA's forest areas, you will appreciate these two days of review papers, which will eventually be produced as a book. There are no workshops, and minimal discussion time.
For further info, contact Glenda Godfrey
Ph: 9334 0463 Fax: 9334 0135 email: glendag@calm.wa.gov.au

Kings Park Festival

21st September - 1st October
Perth's premier wild 'Flower Show'!

Perth Royal Show

28th September - 6th October

This Newsletter is a compendium of articles written by many different people. The views expressed are those of the authors, not necessarily those of the Department of Conservation and Land Management.
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