Coordinator

ASSOCIATION of
SOCIETIES FOR GROWING AUSTRALIAN PLANTS Inc.

Wildlife and Native Plants Study Group Newsletter

AUTUMN/WINTER 2005 ISSUE 49 ISSN: 1038 7897

Dear Members,

Well, it's time for another newsletter yet again. It has been a mixed bag as far as weather goes around the country since the last newsletter, proving to all that climatic conditions do affect our ecological and environmental outcomes. I do hope though that all our members have had some 'highs ' during the last few months.

REMINDER

As winter approaches, I remind you all that **subscriptions ($5 p.a.) are due at the end of June**. I really would appreciate early payments rather than having to chase people for their subs- as this becomes a costly exercise, and takes funds away from the newsletter itself.

THANKYOU

I also thank all those members who have responded to my last call for articles for inclusion in the newsletter. Please drop us a line, and tell us what's happening in your area or region, what you are doing, or your experiences in either or both plants and wildlife. You can even share a grudge if you have one on a particular issue.

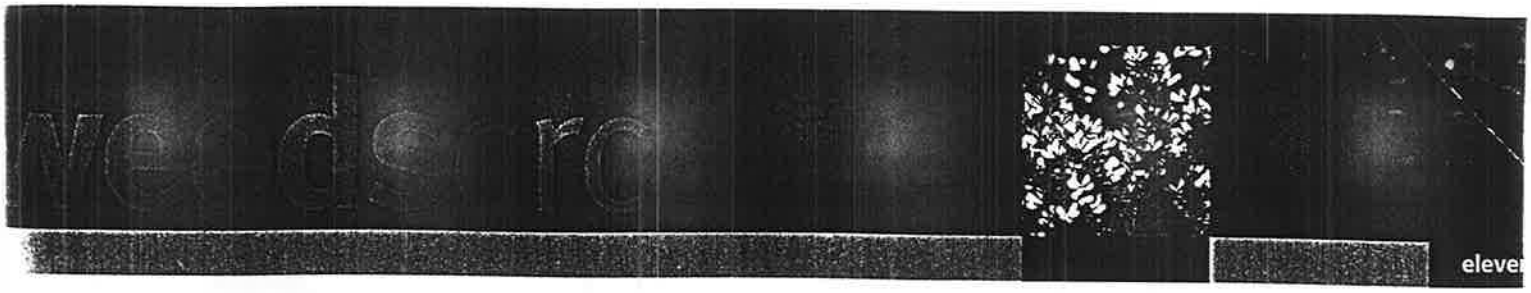
Member Harry Franz from Kingaroy,QLD. reports on experiences with unusual sounds in the night. He writes:

'We had a noisy family of tawny frogmouths around our house at Christmas. The calling went on for weeks and could be heard almost every night then. We saw them at dusk and in the house lights, it took a couple of weeks before we could identify the sound- which is made when they have young- this coincided with the period up until the end of December. A friend played a CD with owl sounds to help identify the calls. We had seen frogmouths here before. We have lots of trees up to 12 years old on our 2 hectare block.

Harry has forwarded an article on habitat trees in his local area. Leigh Murray has also provided us with an insight into the dominant flora (Eucalyptus goniocalyx and Exocarpos cupressiformis) and birds found on her property at Queanbeyan.

Many would-be gardeners cannot undertake work in their gardens because of allergies and sensitivities. The symptoms and problems of allergies in many instances can be related to plants or their pollen. A special article on pollen from plants and allergy appears in this newsletter.

In previous editions we've looked at nectar and honey. These too, can cause sensitivities and allergies to humans. It raises the question of whether such sensitivities also occur in the plant world, and between specific fauna and flora. Any ideas?



Jumping the garden fence: new report lists worst garden thugs

A third of emerging grazing weeds, a fifth of weeds impacting on rare or threatened native plant species, a quarter of the Weeds of National Significance, and a quarter of the invasive plants on the World's Worst Invasive Alien Species list continue to be sold by nurseries, according to a new CSIRO report, *Jumping the Garden Fence: Invasive garden plants in Australia and their environmental and agricultural impacts*.

The report, commissioned by WWF-Australia, and authored by Dr Richard Groves, Dr Robert Boden and Dr Mark Lonsdale, is the most in-depth study of the nature and risk associated with the invasion pathway of trade in invasive garden plants.

It found that of the 720 naturalised invasive or potentially invasive garden plants, 393 (55%) are still available for sale and 72 (10%) are declared noxious in one state but available for sale in other jurisdictions.

The top 10 most serious invasive garden plants for sale

National

Asparagus fern, broom, fountain grass, gazania, glory lily, hybrid mother of millions, Japanese honeysuckle, pepper tree, periwinkle and sweet pittosporum.

New South Wales

Banana passion fruit, broom, cat's claw creeper, glory lily, holly leafed senecio, hybrid mother of millions, lippia, madeira vine, mother of millions and yerba de hicotea.

Tasmania

Asparagus fern, blue psoralea, broom, Cape Leewin wattle, Himalayan honeysuckle, holly, looking glass bush, radiata pine, sweet pittosporum, tree heath.

Victoria

African lovegrass, asparagus fern, gazania, horsetails, oxalis, pepper tree, periwinkle, prickly pear, Spanish heath, Mexican feather grass.

Top End of the Northern Territory

African tulip, candle bush, clumping fishtail palm, golden shower, neem, poinciana, rubber vine, snakeweeds, white teak and yellow bells.

Arid Northern Territory

American cotton palm, couch grass, fountain grass, Himalayan raintree, hybrid mother of millions, lead tree (coffee bush), Mayne's pest, pepper tree, umbrella sedge, white cedar.

Queensland

Coreopsis, glory lily, guava, Japanese honeysuckle, Mickey Mouse plant, murraya, parrot's feather, pink periwinkle, taro and yellow allamanda.

South Australia

Aleppo pine, desert ash, fountain grass, gazania, golden wreath wattle, kikuyu grass, olive, periwinkle, topped lavender, weeping willow.

Western Australia

Arum lily, black flag, broadleaf pepper tree, coastal tea tree, freesia, spotted gum, sweet pittosporum, Sydney golden wattle, watsonia and weeping white broom.

Australian Capital Territory

Black locust, broom (*Cytisus* species), broom (*Genista* species), cotoneaster, firethorn, Japanese honeysuckle, lombardy poplar, olive, radiata pine and white poplar.

Recommendations for the future

Seven recommendations are proposed to lessen the overall impact of invasive plant species deliberately introduced for horticulture and currently available for sale.

The first four recommendations arise directly from this report. They are:

Recommendation 1. At least 80 species that are currently available for sale should be prohibited nationally from sale as an urgent priority. These include the 20 species that are Weeds Of National Significance, species on the Alert List, the 83 species that are declared or noxious, and the 10 species that impact on ROTAP species.

Recommendation 2. The ten most important species available for sale currently in Australia should be prohibited from sale nationally from July 1, 2005.

Recomendation 3. Many other invasive garden plants nominated by individual states, territories or regions should be added progressively to the list of weeds prohibited from sale nationally

Recommendation 4. Amendments or new regulations to the current *Environment Protection and Biodiversity Conservation Act* (Federal) should be considered, to allow national prohibition of the sale of specific invasive garden plants known to be major weeds and to ensure uniformity between all States and Territories.

Three more pro-active recommendations are proposed by the report to further reduce the future impacts of invasive garden plants and promote responsibility shared between government, weed managers and the wider Australian community. These include voluntary associations between nursery groups and weed managers, the active and regular search of land adjoining peri-urban settlements to detect and eradicate newly naturalised plant species, and increased resources to advance the awareness of the Australian community.

If the number of invasive garden plants known to be naturalised and available for sale can be decreased, then the number of future weeds impacting Australian ecosystems, both natural and agricultural, should eventually also be reduced.

The full report can be download from the WWF web site

W www.wwf.org.au

Where are the habitat trees? by Harry Franz

During the last year I became very interested in habitat trees. I have been surveying habitat trees around Manumbar and the local roads between Kingaroy and Manumbar. In our local eucalypt woodlands, usually it is only the very old trees that have hollow limbs. Most eucalypt species have hollows when very old, but few specimens of some species exist now in the landscape.

Local species surveyed with hollow limbs include:

- Qld Blue Gum – *Eucalyptus tereticornis*
- Narrow-leaved Ironbark – *Eucalyptus crebra*
- Smooth-barked Apple – *Angophora costata*
- Pink Bloodwood – *Corymbia intermedia*
- Silver-leaved Ironbark – *Eucalyptus melanophloia*.
- Grey Box – *Eucalyptus moluccana*
- Yellow Box – *Eucalyptus melliodora*
- Spotted Gum – *Corymbia citriodora* subsp. *variegata*

Locally the most common habitat trees are *Eucalyptus tereticornis*. Alan Franks (co-author of "Nest Boxes for Wildlife") told me that surveys and tree core growth ring counts tell us that *Eucalyptus tereticornis* habitat trees with large hollows are at least 300 years old. Small hollows can occur after about 80 years of age. He said that an old Spotted Gum (*Corymbia citriodora* subsp. *variegata*) in Barakula State Forest which was only 40cm across with hollow limbs was aged at 400 years. Storm, wind and lightning can hasten the development of hollows.

Fire can create hollows in trunks and limbs. Bushfire during very dry conditions burns down old green habitat trees as well as younger trees. Dead trees with hollow limbs are still good habitat trees.

Many of the older *Eucalyptus crebra* have been dying in recent years, probably due to drought stress and several summers of being defoliated by caterpillars of two varieties in the Manumbar area. The caterpillar plague disappeared about three years ago.

Some rainforest trees also have hollows.

In the ranges of Wrattens, Kandanga, Jimna and Gallangowan the tall Eucalypt forests contain some good habitat trees. Very old Blackbutt (*Eucalyptus pilularis*) and Small-fruited Grey Gum (*Eucalyptus propinqua*) often have many large hollow limbs. Few old specimens of the tall Grey Ironbark (*Eucalyptus siderophloia*) can be found now. They may have all been sound timber trees. A phenomenal quantity of hardwood timber logs, power poles, bridge girders, bridge and jetty piles have been cut in this area during the last 100 years. On Forestry Reserves in latter years, any habitat trees were marked and kept – some were cut down in earlier times.

Two other Grey gums occur at some locations around Kingaroy and Nanango, *Eucalyptus major* and *Eucalyptus longirostrata*. Very old specimens of these species are all good habitat trees.

Old habitat trees still occur along roads, creeks, in Government reserves and parks and on farms. They were once much more plentiful than now.

Road verges are very important as corridors of the natural vegetation that once grew on neighbouring land. Their protection from all threats is of paramount importance. More needs to be done to manage roadside vegetation better and to minimise damage by the people, stock and utilities that must use it.

Two Great Trees

Leigh Murray

Eucalyptus goniocalyx

By far the dominant eucalypt on our rocky ridge at Queanbeyan NSW is what I think is Eucalyptus goniocalyx. I say I think because it might instead be the very closely related Eucalyptus nortonii. Unable to check with known specimens, I'm deducing that it is E. goniocalyx by its greenish buds and leaves rather than the markedly grey ones of E. nortonii. Also, E. nortonii is often described as a handsome, ornamental tree, and much as we dote on our trees, we don't think anyone could accuse them of being handsome. Ours generally have a poor form, with gawky trunks and branches. They're large trees, maybe 20 metres or more with a wide spread, greyish-green long narrow leaves, and thick flaky bark extending right out to the branches. We have many of these wonderful eucalypts. The birds, who prefer good food to good looks, adore them. The 'mixed mob' of thornbills, pardalotes, fantails and wrens pops around in the canopy, and treecreepers probe the bark for insects. White-winged Choughs forage in the leaf litter, throwing beakfuls over their shoulders with gusto. Honeyeaters abound when the trees are flowering (white flowers, usually in late summer, for a month or more), and then the parrots move in to eat the seeds, which keep them busy for months. We had a rare treat last year when Gang-gang Cockatoos dropped in to dine on the seeds. These trees are listed as koala food trees, but unfortunately there are no koalas in this area.

Exocarpos cupressiformis

As a bonus, E. goniocalyx appears to be a host for the semi-parasitic Exocarpos cupressiformis, the Native Cherry. These bird magnets are root parasites, and at our place they almost always grow near a Euc. goniocalyx. This summer they were loaded with fruit for weeks, and the birds turned up in noisy droves to feast. For the rest of the year, the larger trees (up to about 6 metres high and wide, and very dense) provide shelter to a wide variety of birds.

MEDIA ARTICLES

An article titled **'Big Trees Threatened'** in the *Country News- Shepparton News- (Vic.) 29/3/05* states the obvious that our iconic 'large, lone paddock trees days are numbered.' It reports that `at the current rate of clearing, dieback and natural death, large old paddock trees will disappear from many areas within 40 years. Their isolation makes them vulnerable to climatic fluctuations and disease.'

These trees do have some economic value for farmers in providing shelter for stock and nesting sites for birds, bats, and small mammals - not to mention the great number of insects. They are important links for wildlife movement between patches of native vegetation.

The Goulburn Broken CMA CEO, Bill O'Kane stated that there was 'an urgent need to find cheaper and better ways of ensuring the future of habitat for the benefit of agriculture and the environment.' "We need to turn these isolated wooden statues into dynamic habitat patches." Mr.O'Kane said.'

Roadside vegetation plea *(from Wimmera Mail Times (Vic.) 4/4/05)*

The Wimmera Farm Tree Group has called on municipalities to stop the cropping and ploughing of roadsides across the Wimmera and southern Mallee. The article highlights that roadside cropping has been used as a means to community fundraising.

Ed.Note : Many areas in rural South Australia have already ceased roadside cropping practices in the bid to leave wildlife corridors and habitat.

Reserve Recovery Targeted (*from Country News-Shepparton News 5/4/05,p.32*)

Karen Brisbane reports from the Goulburn Murray Landcare Network on the recovery project happening of the Wyuna River Reserve. This reserve is 170ha. 'and supports two of Victoria's threatened species of animals, the bush stone curlew, which lives among the fallen timber and squirrel glider, which live in tree hollows and feeds on sap from silver wattles. The reserve contains grey box and yellow box trees with native understorey shrubs.' Less than 17% of this vegetation type, it is reported remains in Victoria today. The recovery project includes the installation of cattle grids, the planting of hundreds of indigenous trees and shrubs by local school children, weed eradication, and the construction and installation of nesting boxes. It is just one of the many landcare projects happening across Australia, in an effort to restore some habitat loss.

POLLEN: Biology, and health effects such as allergies

(an abridged article by Christine Jones from an original article by L.Curtis, Sensitivity Matters, Dec,2004)

Biology of Pollen

What is pollen? Pollen is the male propagules or "seeds" which fertilize the female flowers to produce seeds. Pollen usually consists of 3 layers: the outer sexine layer, middle nexine layer, and inner intine layers. Most allergenic pollen is spread by the wind, while other pollen is spread by animals such as bats, hummingbirds, and honey/bumble bees. (Fountain). Pollen ranges in size from about 10 to 200 microns in diameter (1 micron = 1 thousandth of a millimetre, or 1 millionth of a metre). Pollen also varies greatly in shape and structure of their outer surface. For example, maize (corn) pollen is about 100 to 150 microns in diameter with a single pore and a fairly smooth surface, while ragweed pollen is about 20 microns in diameter and is highly spiny with 3 surface pores (Fountain). Many types of pollen have pores which allow allergens and other chemicals to pass through.

The amounts of pollen released can be enormous; for example, a single ragweed plant (2 to 6 ft tall) can release several billion pollen grains per season (Laaidi). Maize pollen is so large and abundant during the early summer pollen season that a person can be visibly covered with yellow pollen after cycling or walking next to maize fields. Pollen is usually deposited near the plant that produced it; however some grass pollen has been known to travel as far as 4,500 kms. (Fountain) The amounts of pollen released can vary tremendously from hour to hour, and depend upon such factors as temperature, wind, humidity and rain (Burge, Suchioglu, Portnoy). Wind gusts preceding thunderstorms often greatly increase airborne pollen levels (Suchioglu).

Pollen contains a mixture of proteins, sugars, DNA, fats and other nutrients needed to fertilize female flowers (Fountain). Over 200 allergenic proteins have been characterized, purified and standardized from common pollen species (White). Some pollen allergens are present in many types of plants, such as profilin which is present in the pollen of many tree and grass species (Fountain). While some concerns have been expressed that genetically engineered pollens may be more allergenic, there may also be ways to engineer pollen to make it less allergenic (Fountain, Lack). Some research has shown that pollen production and length of pollination seasons may be increasing in some plants due to global warming and increases in global carbon dioxide levels. (Traidl-Hoffmann, Ziska).

While most pollen is too large to easily enter the lungs (i.e. much larger then 10 microns in diameter), water or mechanical damage can often cause pollen to break open and release allergenic particles which are smaller than 10 microns and thus can easily enter the nose and lungs (Burge). In addition pollen is often surrounded by small allergenic particles and often has pores which allow allergenic proteins to pass through (Burge). Pollen can maintain its allergenicity for many months in the outdoor environment (Cabrera). Pollen from fragrant flowers can also contain significant quantities of volatile organic chemicals which can cause allergic and sensitivity reactions (Fountain, Eriksson).

Pollen is sometimes used as a human food since it is very rich in proteins, vitamins, minerals and other nutrients (Traidl-Hoffmann). However, pollen is usually expensive and is full of allergens.

Types of pollen and pollen allergens

Over 250,000 plants are known to produce airborne pollen, with over 100 having clinical importance in some parts of the world (Mothes). However pollens are usually classified into one of three types: 1) tree, 2) grass and 3) weed. A brief description of these allergens follows. The scientific genus of plants is noted in brackets.

Many trees produce significant amounts of pollen (Mothes). Birch (*Betula*) pollen is probably the most clinically significant

pollen in many parts of Australia. Oaks (*Quercus*), beeches (*Fagus*) and maples (*Acer*) are also heavy sources of pollen. Olive (*Olea*) and Cyprus (*Cupressus*) pollen are prominent in Mediterranean climate regions, while Japanese cedar (*Cryptomeria*) is also important. Other important tree pollens include plane tree (*Plantanus*), elm (*Ulmus*), hickory (*Carya*), hazel (*Corylus*), mesquite (*Prosopis*), **Eucalyptus**, Willow (*Salix*), cottonwood (*Populus*), ash (*Fraxinus*), lilac (*Syringa*), plantain (*Plantigo*), pine (*Pinus*) and Juniper (*Juniperus*) (Mothes).

Wild and cultivated grasses comprise about 35% of the earth's vegetation. Grasses are found in almost all parts of the world and are especially abundant in parts of Australia. (Esch) The most common wild grass pollens include bluegrass (*Poa*), bent grass (*Agrostis*), fescues (*Festuca*) and ryegrasses (*Lolium*). Many cultivated grasses produce large amounts of pollen including wheat, oats, rye, rice, wild rice, corn, sorghum, millet and sugarcane. At least 13 different families of grass allergens have been described globally (Esch). Many humans allergic to one grass pollen react with other grass pollens because they are cross reactive (Esch).

Weed pollens come from many plant genera. The most clinically important weed allergen in many parts of the world is ragweed (*Ambrosia*). Originally native to North America this has spread to most temperate regions of the world (Laaidi). Relatives of the ragweed causing allergic reactions include Golden rod (*Solidago*). Other important weed pollen allergens include sage/mugwort (*Artemesia*), feverfew (*Parthenium*) pigweed (*Amaranthus*), *Chenopodium* species, dock (*Echium*), mustards (*Brassica*), and plantain (*Urtica*). Hemp (*Cannabis*) was also found to be a clinically important allergen. A large number of weed pollen allergens have been isolated, and most humans sensitive to one weed pollen will react to other weed pollens (Mohapatra).

Pollen calendars

Generally, tree pollen is shed in late winter or spring, grass pollen in late spring to summer, and weed pollen from mid summer to mid autumn. Many newspapers, websites and weather forecasters list daily airborne counts of pollen and mould.

Relevance to Australia

Trees: mostly late winter and spring. Most important tree pollens include many introduced species such as birch, maple, olive, poplar, ash, oak and pines.

Grasses: mostly mid spring to summer. Worst allergenic grass pollens in Australia include ryegrass, bermuda grass, blue grass, paspalum and prairie grass.

Weeds: The worst allergen producing weed in Australia is plantain - which is produced spring to autumn. Other important weed pollen allergens include *Parietta* or asthma weed (spring to autumn) and Paterson's Curse /Salvation Jane (*Echium*) (spring). Ragweed (accidental import) is an important autumn pollen in some parts of Australia, and particularly in NSW.

Some health effects of pollen exposure

Allergy to pollen is common and much higher in Australia than that reported by Europeans, at 10-25% for asthma and hay fever symptoms. A number of studies have linked pollen exposure to health problems, especially to asthma and rhinitis. An Australian study noted worsened asthma and rhinitis symptoms, and more use of medication during the late summer period. (Bass). Studies have also reported a relationship between pollen exposure and conjunctivitis (Gonzalo, Joss). Pollen exposure can trigger contact dermatitis in pollen sensitive children (Cabon). Many people report that they suffer more gastrointestinal complaints like diarrhoea, cramps and nausea when exposed to inhalant allergens like pollen, moulds or mite allergens. Exposure to respiratory allergens like pollen may therefore increase risk of allergy and leaky gut in the digestive tract. Pollen has also been linked to neuro-psychiatric problems. Pollen has been

blamed for poorer memory, slower cognitive processing and more depression and mental fatigue during periods of high outdoor pollen concentrations. (Marshall). A seasonal form of depression occurs in Australia.(Jones) Heavy pollen exposure has also been linked to more migraine headaches in pollen sensitive patients (Sibbald).

A study found that ozone and pollens from tree, grass and weeds increased risk for asthma hospitalization, and the combination of ozone and pollen exposure had a synergistic effect ie. hospitalisation risks increased by significantly more than the sum of individual risk factors (Dales). Diesel particles can bind to pollen particles, which may be more allergenic than a pollen particle alone (Know). Cypress pollen allergy is more common in areas of high outdoor air pollution (Di Felice). Some epidemiological evidence also suggests that exposure to pollutants such as diesel exhaust can significantly increase the risk of allergy to pollen and moulds. (Jannsen, Wyler) Accidents are also more common in those taking sedating anti-histamines such as Benadryl or Claritin during heavy pollen seasons. (Hanrahan)

Treatment for pollen-related health problems

The best treatment for most allergens and chemicals is avoidance. Pollen avoidance is difficult since pollen is produced extensively in most outdoor environments and rarely produced in indoor environments. Local pollen level can be controlled somewhat by prudent landscaping. For example, planting of high pollen producing plants like grasses and composite flowers can be avoided, and plants which are insect pollinated can be planted or female plants which do not produce pollen can be used instead (Ogren). Some pollen allergic patients have reported relief when moving to a different geographical location, however many of these people may develop new allergies to pollens endemic to their new region. Some pollen allergic people use face masks and/or eye goggles when outside during high pollen periods. Personally, I have found that wearing sunglasses, and using a nasal pollen blocking cream (containing petrolatum) does significantly reduce the nasal symptoms experienced while also improving airflow. This coupled with staying indoors on a high wind or high pollen count day, and the use of anti-histamines helps me, to enjoy the bush or garden at a more appropriate time.

Indoor pollen levels are controlled largely by outdoor pollen levels (Burge). The use of electrostatic air filters have been found to significantly reduce indoor levels of pollen and pollen allergens (Holmquist). HEPA air filters have been found to be very effective in removing mould spores from air and are probably also efficient in removing pollen from indoor air (Sheretz).

Immunotherapy is probably the most common way to treat pollen allergy. Medication may be needed to treat some adverse reactions to pollen. For asthma related symptoms, standard drug treatment includes inhaled steroids (such as Flucticasone), and alpha adrenergic (albuterol) or cromolyn (anti inflammatory agent) and oral treatment with theophylline (Tierney). Nasal related pollen symptoms may be treated with inhaled steroids (such as beclomethasone or fluticasone), oral or inhaled histamines, or oral decongestants like pseudoephedrine (Sudafed) (Bush) As noted above, use of oral antihistamines may cause drowsiness and should be used with caution. Conjunctivitis and other eye symptoms may be treated topically with steroids, levocabastine or keratolac non steroid anti inflammatory agent (Tierney).

Pollens vary a lot within states. Find out about the plants and pollens in your area. Often terpenes from flowers, leaves or wood cause symptoms, instead of, or as well as, the pollen. There are also many other pollens in Australia that can cause problems. It is possible to have, and to enjoy a native garden. Its just that a little more care must be used in selecting plant species, and their placement, and the use of some common sense as to when you spend time in a garden.

Plants need pollen to survive. Birds and bees are the best honey/pollen collectors. Use plants wisely. A good book on this subject is :
The Low Allergy Garden, by Mark Ragg, (1996) published by Hodder & Stoughton.

Happy gardening!

GLOSSARY

Anther: In a flower, the upper part of a stamen containing pollen grains.

Carpel: The female part of a flower containing an ovary in which there varying numbers of ovules containing embryo sacs within which are the female gametes.

Chromosomes: The hereditary material within the nucleus of cells, which links one generation with the next. Each species has characteristic numbers and types of chromosomes. Chromosomes control cellular activity. They consist of sub units called genes which contain coded information in the form of the chemical compound DNA.

Diploid: Describing a nucleus, cell or organism in which the full complement of chromosomes is present, these occurring in pairs of homologous chromosomes. All animal cells, except gametes, are diploid, since gametes contain half the diploid number (haploid) as the result of meiosis.

Fertilization: In flowering plants, after pollination, pollen grains deposited on stigmas absorb nutrients and pollen tubes grow down through the style and enter the ovules through the micropyles. The tip of each pollen tube breaks down and the male gamete enters the ovule and fuses with the female gamete. After fertilization, the ovule, containing the plant embryo, develops into a seed, and the ovary develops into a fruit.

Flower: The organ of sexual reproduction in flowering plants (angiosperms).

Insect-pollinated flowers have brightly coloured and scented petals, and usually have a nectary. The stamens and carpels (with sticky stigmas) are within the flower. These adaptations favour insect pollination.

Wind pollinated flowers are small, often green and unscented, and do not have nectaries. The anthers and flowering stigmas dangle out of the flowers when ripe thus facilitating wind pollination.

Gametes: A reproductive cell whose nucleus is formed by meiosis and contains half the normal chromosome number.

Gametophyte: Phase in the life cycle of a plant that bears gamete-producing organs. In plants that demonstrate alternation of generations it may or may not be the dominant phase, but arises from the development of a haploid spore from the sporophyte generation.

Haploid: Describing a nucleus, cell or organism having a single set of unpaired chromosomes. The haploid number is found in plant and animal gametes as the result of meiosis. In plants with alternation of generations, the spores and gametophyte generation (gamete-producing stage) are haploid.

Homologous chromosomes: Pairs of chromosomes that come together during meiosis. They carry genes that govern the same characteristics. Homologous pairs of chromosomes are found in all diploid organisms, one of the pair coming from the male gamete, and the other from the female gamete, the pair being united at fertilization.

Meiosis: A method of nuclear division that occurs during the formation of gametes when a diploid nucleus gives rise to four haploid nuclei. There are two consecutive divisions. In the first the homologous chromosomes may exchange genetic material as they lie side by side, and this leads to variation in the resulting nuclei. This process is called *crossing over*. This is followed by the second division.

Micropyle: 1.A pore in a seed through which water is absorbed at the start of germination. 2. Pore in the ovule of a flower through which the pollen tube delivers the male gamete.

Ovule: A structure in flowering plants which develops into seed after fertilization.

Pollen: Reproductive cells of flowering plants, each containing a male gamete. Pollen grains are adapted to their mode of

transfer, either by insects or by wind. Spiky and sticky for insect pollination. Smooth and light for wind pollination.

Pollination: The transfer of pollen grains from stamens to carpels in flowering plants. Pollination within the same flower or between flowers on the same plant is called *self-pollination*. Pollination between two separate plants is called *cross-pollination*. Normally male and female parts of the same plant do not mature simultaneously, favouring **cross-pollination** with a consequent mixing of chromosomes, which can lead to variation. Pollen is transferred on the bodies of insects or by the wind. Flowers are adapted to favour one particular method of transfer.

(a) Insect pollination - insects visit flowers to drink or collect nectar, attracted by the colour or scent of the flower. Their bodies become dusted with pollen, some of which may adhere to the stigmas of subsequent flowers which they visit.

(b) Wind pollination -Pollen grains carried by the wind must be produced in much higher numbers to compensate for loss during transfer.

Sporophyte: A phase in the life history of a plant that produces spores. In plants that show alternation of generations it may or may not be the dominant phase. It arises from the diploid zygote.

Stamens: The male part of a flower in which pollen grains are produced. Each stamen consists of a stalk (filament) bearing an anther.

Stigma: A sticky structure in a flower which traps incoming pollen during pollination.

Variation: Differences in characteristics between members of the same species. There are two main types- (a) **continuous variations** in which there are degrees of variation throughout the population showing normal distribution around a mean; (b) **discontinuous variations** which are absolutely clear cut, ie. there are no intermediate forms, and they do not show normal distribution and are used when doing genetic crosses. Variations within a species results either from inherited or environmental factors or a combination of both.

Zygote: The diploid cell resulting from the fusion of two gametes during fertilization.

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BIRDS IN SERVICE OF PLANTS

Information from Birdscaping Your Garden-How to attract Australian native birds to your Garden (1980) by George Adams.

Pollination of plants is carried out by natural elements such as wind as in the case of casuarinas. However most flowering plants adopt various methods of attracting pollinators. The pollinators have special senses which help them to pollinate effectively.

Bees are attracted mainly to blues and yellows and /or those that reflect ultraviolet light. Moths pollinate white flowered plants such as pittosporum at night. Flowers pollinated by insects usually have flat, open petals to provide a suitable landing pad. The colour variations and patterns are used as directional markers for insects seeking nectar.

Nectar is contained in a small, cup-shaped structure at the base of the flower and the intending pollinator must brush against the stamens. Pollen is deposited on the legs and body of the pollinator, and when he visits another flower some of the pollen material is transferred. The stigma is sticky enabling the pollen to adhere to it effectively. This cross-pollination produces a more vigorous, adaptable and flexible plant.

Flowers have evolved and developed in such a way that only the most suitable pollinators are rewarded with nectar. Most Grevillea flowers, have a network of fine hairs to protect the nectar from insects and save it for honeyeaters, the pollinators. The strong, slender, curved beak of the honeyeater is able to push through the network of hairs for the nectar reward.

Honeyeaters are a significant pollinator of Australia's native flora .

MEDIA ARTICLES

'Wildlife facing extinction in the SA Murray Darling Basin' *(Murray Valley Standard (SA) 24/3/05 p.7.)*

'Throughout the South Australian Murray Darling Basin, many species of flora and fauna are faced with the threat of extinction. Some of these species, such as the Malleefowl are widely recognised by members of the local community and many people are familiar with the threats they face. There are however, other threatened species in the region that are not widely recognised, such as the mallee emu-wren and Metallic sun-orchid. Many species of threatened flora are located in the lower section of the SA MDB around Strathalbyn, Murray Bridge and Tailem Bend.

The Monarto Mintbush *(Prostanthera euryboides)* has been identified as critically endangered in the region by local experts and scientists from the Department of Environment and Heritage. This species is found in the Monarto area with less than 700 individuals currently surviving. This species is threatened by weed invasion, grazing by introduced and native herbivores, road and rail maintenance, recreation activities and other disturbances. Without concentrated efforts this species could disappear from the region.

The Mallee emu-wren is restricted to Ngarkat and Billiatt Conservation Parks and neighbouring private lands. This bird requires old growth mallee and heath vegetation to survive. This vegetation is poorly represented in today's landscape due to several large-scale wildfires... Since then very few sightings of this bird have been made.....

Other bird species of concern in the Mallee include the western whip-bird, Malleeefowl, striated grasswren, red-lored whistler and black --eared miner while in the river corridor, the regent parrot and bush stone-curlew face a similar plight.'

'Native invasion now hard to control' *(Border News, Moree Champion (NSW) 15/3/05)*

The Shires Association indicated its disappointment with NSW Government over the lack of consultation in the proposed new Native Vegetation Act 2003. Moree Plains Shire, one of 15 western Division shires and associations spokesperson, Cr.Miller, said that 'under the proposed regulations, exemptions for the clearing of invasive scrub will be lost to western division farmers'. He suggested that 'there is a big difference in handling woody weeds in the western part of the state, rainforests on the north coast, and the plains and hills around Jindabyne'. 'Our members want the Government to urgently address the issue of woody weeds or invasive scrub management prior to introducing native vegetation regulations.' The legislators have to realise that if woody weeds or native vegetation gets out of control because farmers are handcuffed, then you'll see the loss of native grasses, birds and wildlife.'

'Nutgrass proves a hard pest to eradicate' *(Rural Weekly, (QLD) 18/3/05, p.4).*

Nutgrass *(Cyperus rotundus)* is a perennial plant introduced in the 1970s by the Department of Agriculture. Today it is a major weed pest and hard to eradicate. 'The plant propagates under the ground by the formation of tubers or rhizomes and these then develop a shoot or sucker from points along this chain.'

'It's name suggests it is like grass and it really looks like a grass, however it is actually a sedge. There are quite a few types of sedge which adorn ponds... Cyperus rotundus from Asia is a real pain.'

Many a time has soil been transported to a separate location by shovels, trucks, dozers, cultivators, floodwater and animals to start up another patch of nutgrass. This is its main spread factor, and has given many... costly control decisions to try and eradicate it.'

' My first bit of advice is prevention rather than cure. Don't let it in your patch of clean country.
My second bit of advice is for those small isolated plant patches in high value areas. It involves lots of digging and following the rhizomes to the nuts with a suitable disposable method on hand as you exhume this plant material....
My third point of control method is by chemical means...there are chemicals that do work on nutgrass, however, it is not usually a one hit wonder product. It's all about controlling your nutgrass and not giving it a chance to regenerate. ...the effects are slow and you have to keep at it.'

'Great Artesian Basin Recovering' *(QLD. Country Life, 10/3/05 pg.17)*
'The Great Artesian basin is on the road to recovery after more than a century of ailing health.' GAB Co-ordinating Committee Chairman Jeff Austin said the decline in artesian pressures in the basin -the result of nearly 35,000 bores being drilled into it - was being arrested. '

'The GAB is one of the world's largest artesian basins, underlying more than 1.7 million square kilometres, or one-fifth of Australia. The recovery is the result of...a program to cap free-flowing bores and replace open-bore drain with polyethylene pipe.'
'Before capping and piping, up to 95 per cent of the water flowing out of artesian bores was wasted through seepage and evaporation.'

'So far, the greatest recovery is north-east of Lightning Ridge, near the Qld-NSW border, where pumps that had been servicing piping schemes for many years are now redundant. This means that some bores that had stopped flowing are running again.'
'Two other areas of significant recovery are between Julia Creek and Richmond, in QLD, and Coward Springs and Oodnadatta in South Australia.'
'The GAB was formed 100 to 230million years ago from water bearing sandstone layers (or aquifers) separated by impervious layers of siltstone and mudstone. The layers increase in total thickness from less than 100m on its edges to more than 3000m near the centre. It is estimated thae basin supports 183,000 people and contributes $3.5billion a yearr to the Australian economy. Without it, most of outback Queensland and large parts of northern NSW and South Australia would be empty. The basin is estimated to contain 64,900 million megalitres of water- the equivalent of 64,900 million Olympic size Swimming pools. European settlers sank the first bore near Bourke in NSW in 1878, and by 1915 more than 1500 artesian bores had been drilled across the Basin.'
'By the end of last century, water from 4700 artesian basins flowed into more than 34,000 km.of open bore drains. There were also about 30,000 sub-artesian bores, which needed windmills or pumps to bring the water to the surface. But over-extraction caused artesian pressures to fall and, by the end of last century, 1400 bores had stopped flowing.'

'Forest, vegetation information' *(Sunraysia Daily (Vic.) 19/3/05)*
The latest information on Australia's diverse forest and vegetation resources is now available on-line. Produced by the Bureau of Rural Sciences with a $3.2million funding from the NHT the new website - - http.://data.brs.gov.au.mapserv/intveg/index.html-- will allow people to have access to a single map of vegetation resources across Australia. It includes native forests and grasslands, as well as non-natives like pine plantations and crops.

'NSW extends Mungo National Park size'. *(Sunraysia Daily (VIC), 14/3/05 p.2)*
'Mungo National Park is one of three reserves within western NSW to be extended by a total of 77,000 ha. under a State Government plan to help protect the State's bushland, wildlife and cultural heritage.'
'Other areas to benefit from the plan are the Narran Lake Nature Reserve north east of

Brewarrina, and the Nombinnie State Conservation Area west of Condobolin.'

'"The additional 77,000 ha. now enhance the parks and reserves system in western NSW and help protect a diverse range of flora and fauna, including many threatened species." Mr Debus (NSW Environment Minister) said. He went on to add that the 25,000ha. Numbucurra Block addition to Mungo NP, contains an area of cultural significance to the local Pakaantyi, Mutthi Mutthi and Ngyiampaa people, who jointly manage the park with the NSW NPWS.

The 900ha. addition to the Narran Lake Nature Reserve would help protect unique spinifex-ironbark plant communities, and the new 49,000ha.reserve at Nombinnie State Conservation Area links two separate parts of the Nombinnie Nature Resrve. With Yathong and Round Hill Nature Reserves, it will help to protect the largest continuous stand of mallee in NSW, and form a connecting reserve of more than 240,000ha.

Mr.Debus also said "The state conservation area contains open woodlands that provide habitat for a range of declining woodland bird species - more than 90 of these species are known in the area including the endangered red-lored whistler and malleefowl."

'Blueprint for Terminal *Lakes'* *(Wimmera mail Times 14/3/05)*

'A study proposes intermittent flows to the Wimmera River to maintain their environmental significance. The lakes include Lake Hindmarsh, north-west of Jeparit which has national status while Lake Albacutya, north of Rainbow, has international environmental standing and is covered under by the Ramsar agreement.'

`It also lists the Wimmera River as a Heritage River.'

The study identified that "these systems are unique and support a range of listed flora and fauna due to their well-preserved state, linkages to other important habitats, significant size and their alternating aquatic and terrestrial phases. It recognises that the lakes have environmental significance in both their dry and flooded states."

'The study further recognises stress on the region's historic redgums.'

The Water Minister John Thwaites made the following points. "When dry, the lakes support grasslands and a range of fauna." "When flooded, the lakes and their connecting channels become major aquatic ecosystems retaining water for several years and supporting significant breeding in bird and fish populations. Flooding is important to the survival and regeneration of redgum woodlands"

'Grim outlook for Murray's big trees' *(The Australian 15/4/2005)*

'The health of redgum and black box along the Murray River is deteriorating, with 75% of trees either dead, dying or stressed after being deprived of water because of extended drought and increased water use by irrigators.'

'A study of 155 sites over 1450km of river, from Gunbower in Victoria to Mannum in South Australia, suggests a grim outlook for the habitat and 4000 trees that need higher flows and flooding each year.'

Australia's Virtual Herbarium. (*From ASGAP Newsletter No.34 May 2005.*)

For those with internet access check out this website -- --

The AVH is an on-line botanical information resource. There are currently some 6 million specimens lodged in Australian herbaria, and once this information is completed information regarding geographic distribution will be accompanied by images, descriptions and identification tools.

'Saving metro Perth's biodiversity' *(Australian Farm Journal Bush April 2005, p.20)*

The metropolitan area of Perth is expected to have a 52% growth rate in 25 years with a need for 375,000 new homes. Guidelines for the retention of significant natural areas have recently been launched - which cover biodiversity protection and management, local planning, an incentives strategy for private land conservation, and an action plan.

Arundo donax: a thirsty giant

from 'WeedWatch' 8 Vol 2. March 2005

Giant reed plants growing along the Yarra River in Ashburton, Victoria
Photo: Lalith Gunasekera

Giant reed, also known as wild cane, is a member of the grass family (*Poaceae*), and one of the largest herbaceous perennial grasses. It looks like a leafy bamboo and prefers stream banks and other riparian zones.

It attains heights of 6-8 m and once established tends to form large, continuous root masses. A single clump typically has hundreds of stems that grow very close together and very rapidly in spring and summer.

Giant reed produces rhizomes and deep fibrous roots to support its tall hollow stems. The blue-green leaves are about 2.5 cm wide and 30 cm long with a heart-shaped base. It produces a tall (60 cm long) plume-like flower head at the upper tips of the stems, the flowers closely packed in a cream to brown coloured cluster borne from early spring. It does not appear to produce viable seed in most areas.

It uses prodigious amounts of water, as much as 2000L/metre^2 of standing *A. donax*, to support its high rate of growth. Under optimal conditions it can grow more than 5 cm per day.

Giant reed came to Australia as an ornamental plant. Recent observations found that this species is an emerging weed around Melbourne creeks and rivers. A large infestation of giant reed has been located by Melbourne Water on the bank of the Yarra River in the Warburton area. Management options for this infestation are being planned by the water authority.

Management of giant reed

A suitable method to control giant reed depends on the presence or absence of native plants, the size of the stand, the amount of biomass which must be dealt with, the terrain and the season.

Mechanical methods

Minor infestations can be eradicated manually, especially where sensitive native plants and wildlife may be damaged by other methods. Hand pulling works with new plants less than

Arundo donax: a thirsty giant continued [redacted]..

2 m in height, but care must be taken that all rhizome material is removed. Plants can be dug using hand tools, especially in combination with cutting of stems near the base with pruning shears, machete or chainsaw. Stems and roots should be removed or burned on site to avoid re-rooting. Mechanical eradication is extremely difficult, even with use of a backhoe, as rhizomes buried at 1-3 m readily re-sprout.

Chemical control

In many, if not all situations, it may be necessary to use chemical methods to achieve eradication, usually in combination with mechanical removal.

The key factor to effective treatment of established giant reed is killing the root system.

This requires treatment of the plant with systemic herbicide at the appropriate time of year to ensure translocation to the roots. This type of herbicide can be applied to clumps of giant reed after flowering, either as a cut stump treatment or as a foliar spray. Solution must be applied immediately following cutting the stem because translocation ceases within minutes of cutting (a five minute maximum interval is suggested). New growth is sensitive to herbicides. Thus a common alternative is to cut or mow a patch and allow regeneration, returning three weeks to three months later to treat new growth when 1-2 metres tall. ■ Lalith Gunasekera

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