



## NEWS



### Autumn 2007

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#### From the Office

Our apologies for the non-production of our summer edition of our newsletter. We have lost our previous editor, Liz Riley, due to demands on her time from elsewhere. Liz did a splendid job, not only with her editorial tasks but also reminding contributors to submit their articles in a timely fashion.

Thank you Liz for your long standing support towards this vital means of communication. As you can see from the following press release from the chair of our very newly established fund, Geoffrey Weule, the long process involved in gaining our tax deductibility has ended. Geoffrey was appointed by the Management Committee to chair the fund committee. An initial meeting of this committee will be called very shortly.

Thanks to Jenny, John and Irene the street stalls in Blackheath, Wentworth Falls and Springwood have been very successful over the warmer months. As from the end of June both these stalls and the Saturday morning nursery will be deferred until after winter. The bleak winter winds are not conducive to hanging around village streets or managing sales in the nursery. Our last street appearance will be Winter Magic Festival on June 23rd in Katoomba. If you can help out either setting up, dismantling or staffing the stall, please contact me.

This year seems to be the one when several of our active volunteers have chosen to holiday overseas. From July until November we will be short on nursery and rescue volunteers so if any members have a little time to give to these two activities it would be greatly appreciated. Please contact me.

A reminder that memberships are due in July for the following financial year. Our rates are still \$11 for active volunteers, \$25 for 'Friends' and \$110 for organisations, all inclusive of G.S.T. A tax deductibility status now allows donors to claim donations as a tax deduction! We have purchased a new green house with a grant given by Australia Post and Landcare. The site will be prepared and the green house erected by volunteers from Green Corp. This group of young people will spend several days throughout the next six months, not only installing the green house, but also learning about nursery work, from seed and cutting collecting to propagation. They will also be doing rescues, growing them on, maintaining them and labeling them correctly.

Judy McLean

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#### Nursery Coordinators Report

Well we had a fair bit of disruption in the nursery earlier in the year. Quite a few trees had to be felled and this required us moving much of the stock from out the front. My thanks to all those who helped out moving everything back and forth.

During April we had a sale of various plant species that we had an over abundance of and this went quite well but we still have a lot of those species. We might consider having another sale in spring.

National Tree Day will be upon us soon and this event keeps us quite busy. Often we are asked by schools to come and join in and give a bit of a talk about the nursery and plants in general. This is always a good opportunity for us to get out into the community and do a bit of 'educating'.

We are lucky enough to have the Green Corp team to help us about the nursery. This will be an ongoing thing as there is a new team every six months. This works well both ways as we have a few bigger tasks that they can do as well as the usual nursery chores. They get to learn about plants and what we do and we get to complete some of the larger tasks around the nursery. They will be helping us to set up our new shade house which we purchased with the help of a grant from Australia Post and Landcare. This is quite exciting for us!

Tanya McLean

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## Rescue Coordinator's Report

Rescues were a bit slow over the summer months but have certainly picked up since then. We were very lucky to get the rescue at Greaves Creek thanks to Sydney Catchment Authority. This has resulted in us getting some quite difficult to grow plants such as Coral Fern (*Gleichenia* spp.). These rescues are now looking very good.

We have been getting a lot of phone calls from people buying property and they generally hear about us through word-of-mouth which is most encouraging. The rescue team has also been kept busy by Sydney Water who are installing the sewerage line from Mount Victoria to Katoomba. We have two environmental scientists at Sydney Water who have been really helpful in offering us rescues before serious works start in various sections around Blackheath and Medlow Bath. Some of these rescues will be going back to where they were rescued from originally which is always a good thing.

We have also rescued quite a few plants from the grounds of Clairvaux which will also eventually go back to where they came from. This has been possible because there have been extensive works carried out here as part of a large vegetation management plan being implemented on the grounds here. So all in all we have been kept quite busy on the rescue front and thanks to all those who are participating in them. A sterling job done by all!

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## Autumn Features

Following is an article about plants and nutrients. This will be in four instalments over the next four issues of the Newsletter. The first part is an introduction, the second part will be on root adaptations, the third part symbiotic adaptations and the fourth part on parasitic and carnivorous plants.

### **An overview of the specialized mechanisms used by Australian plants for nutrient uptake**

#### **Introduction**

Plants require nutrients in order to carry out the physiological and biochemical processes necessary for growth and reproduction. The soils of Australia are generally low in nutrients particularly phosphorus and nitrogen. Consequently plants utilise a number of mechanisms to overcome the challenges of nutrient deficient soils.

The root systems of plants are specialized organs adapted for the function of nutrient up take. Plants living in low nutrient soil have evolved specific root morphologies and physiology to overcome these deficiencies They may also form symbiotic relationships in order to enhance nutrient uptake, (such as mycorrhizal fungus or bacteria).

Some plants utilise even more specialized strategies to obtain their nutrients. These are the parasitic plants (which parasitise other plants) and carnivorous plants (which obtain some or most of their nutrients from insect prey).

#### **Nutrient needs of plants**

Apart from the intake of CO<sub>2</sub>, and H<sub>2</sub>O during photosynthesis, plants also require other nutrients for the physiological and metabolic processes of growth, sustainability and reproduction. These are generally divided into the macronutrients (nutrients required in

relatively large amounts) N, P, S, K, Mg, Ca and the micronutrients or trace elements, (nutrients required in relatively small amounts) Mn, Zn, Cu, Mo, B, Cl and Fe.

After C, O and H, Nitrogen is the most abundant element in plants and growth is limited by its supply. In Australia, phosphorus(P) is seen as most limiting as many Australian soils are low in phosphorus. P is unavailable to the plant from the parent soil. That is, P is either bound to other elements, insoluble in water or is bound to soil particles. P must therefore be converted into forms available to the plant,  $\text{HPO}_4^{2-}$  or  $\text{H}_2\text{PO}_4^-$  (phosphate).

Apart from N and  $\text{CO}_2$  (which is taken in via the leaves) mineral nutrients are derived from the soil and assimilated or 'taken up' by the roots of plants, which are specifically adapted for this process. Leaves can also take up nitrogen, but in plants growing in nitrate-poor soils most of the nitrogen is assimilated by the roots.

### Low Nutrient Soil

Much of the Australian land mass is very old and has been relatively untouched by the rejuvenating effects of glaciation. As the last major period of glaciation occurred 250 Ma during the Permian, much of the soil has been leached of nutrients and consequently Australian soils are extremely infertile.

A distinguishing feature of Australian vegetation is its scleromorphy\* and this is generally seen as an adaptation to soil nutrient deficiency rather than a lack of water. The low phosphorus soil levels in Australia are seen as limiting not only due to its essential role in the metabolism and structure of plants but also because soil phosphorous levels regulate nitrogen fixation.#

Aridity and acidity are common conditions experienced in Australian soils. The availability of many soil nutrients is dependent not only on water availability and temperature, but also on pH. In order to overcome these limitations the plants of Australia have adopted a diverse range of mechanisms to assist in nutrient uptake.

\* Scleromorph: a plant whose leaves (or stems, if leafless) are hard in texture, usually having a thick cuticle.

# Nitrogen fixation: the bacterial process which makes soil nitrogen in a form which can be absorbed by the roots.

**Table 1.** Macro- and micronutrients essential for plant function.

Element	Taken up as	Function in Plant
Macronutrients		
N	$\text{NO}_3^-$ , $\text{NH}_4^+$	In amino acids, proteins, nucleic acids, nucleotides, chlorophyll. Essential component of protoplasm and enzymes
P	$\text{HPO}_4^{2-}$ , $\text{H}_2\text{PO}_4^-$	In ATP, ADP (molecules providing energy to cells), Nucleic acids, necessary for phosphorylation
S	$\text{SO}_4^{2-}$ , $\text{SO}_2$	In proteins, coenzymes, some amino acids
K	$\text{K}^+$	In enzymes, amino acids, protein synthesis, regulation of hydration, membrane potential, osmoregulation, enzyme activation, stomatal movement
Mg	$\text{Mg}^{2+}$	Part of chlorophyll and pectates, enzymes, ribosomes
Ca	$\text{Ca}^{2+}$	In pectates, cell walls, enzymes, cell permeability, regulator of membrane and enzymes activities
Fe	$\text{Fe}^{2+}$ , $\text{Fe}^{3+}$	Component of enzymes
Micronutrients		
Mn	$\text{Mn}^{2+}$	Cofactor/activator of enzymes, stabilises chloroplast structure
Zn	$\text{Zn}^{2+}$	Component/activator of enzymes, chlorophyll formation
Cu	$\text{Cu}^{2+}$	Component/activator of enzymes
Mo	$\text{MoO}_4^{2-}$	Component of enzymes, in nitrogen fixation and reduction
B	$\text{HBO}_3^{2-}$ , $\text{H}_2\text{BO}_3^-$	Influences $\text{Ca}^{2+}$ utilization, bound to carbohydrates
Cl	$\text{Cl}^-$	In photosynthesis, osmosis and ionic balance

**Table 2.** Abbreviations

Abbreviations		Micronutrients	
Macronutrients			
C	= Carbon	Mn	= Manganese
H	= Hydrogen	Zn	= Zinc
O	= Oxygen	Cu	= Copper
N	= Nitrogen	Mo	= Molybdenum
P	= Phosphorus	B	= Boron
S	= Sulphur	Cl	= Chlorine
K	= Potassium	Fe	= Iron
Mg	= Magnesium	Ni	= Nickel
Ca	= Calcium		

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## PRESS RELEASE

### THE FLOWERS WILL BLOOM IN THE SPRING TRAIL

An unlikely shower has fallen on hundreds of native plants, many endangered from potential extinction through global warming, in the form of a 'gift' from the Federal Government. The Federal Member for Macquarie, Kerry Bartlett M.P. recently advised the Committee and Volunteers of the wildplant and rescue organisation of some very welcome news. The Katoomba based, Blue Mountains Wildplant Rescue Service Inc has been endorsed as a Deductible Gift Recipient by the Australian Taxation Office allowing all future donations to this essential service be tax deductible.

The fund to be known as the Blue Mountains Wildplant Rescue Fund will be chaired by local Katoomba resident, Geoffrey Weule.

'This is a major breakthrough for the Wildplant Rescue Service', Mr. Weule said. 'For the past ten years it has been a real struggle making ends meet however this new Federal Government concession is a great boost for us and hopefully it will now attract a new level of funding, so vital for us to carry out our very important environmental and preservation work'. Mr Weule, senior lecturer in Business Studies at the Western Sydney Institute of TAFE, Nirimba Campus, hopes that not only local businesses but businesses right across Australia together with members of the general public will now think seriously about supporting this major community enterprise that is a life-line for some of the world's most beautiful native endangered plants in a World Heritage environment.

Ms Judy McLean, Treasurer of the B.M. Wildplant Rescue Service said initially they received a grant from the State Government but it fell a long way short in maintaining on-going sustainability, so this news is crucial in maintaining our financial security.

Tax deductible donations, made payable to the Blue Mountains Wildplant Rescue Fund, may be sent to the Fund's offices at 14 Oak Street Katoomba 2780.

For further information please contact;

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