



Association of Societies for Growing Australian Plants

ACACIA STUDY GROUP NEWSLETTER

Group Leader
Esther Brueggemeier
28 Staton Cr, Westlake, Vic 3337
Phone 0411 148874
Email: wildaboutwattle@iprimus.com.au

Newsletter Editor
Bill Aitchison
13 Conos Court, Donvale, Vic 3111
Phone (03) 98723583
Email: aitchguy@gmail.com

No. 104 March 2009

ISSN 1035-4638



Contents	Page
From the Leader	1
Vale – Irene Cullen	2
Welcome	2
Feature Plant – Acacia peuce	2
Small and Interesting Wattles	2
Cranky Wattles	4
Notes From Members	5
Wattle Recipe Corner	5
An Accidental Discovery	6
Acacia Flour	7
Cancer Fighting Wattle Seeds	8
Talking Wattles	8
Acacia peuce	9
Study Group Photo Library	14
Study Group Membership	14
Seed Bank	14

called drought tolerant plants, gave up in exhaustion as the air sucked away every last drop of moisture.

After January, I received many comments about which plants had survived this ordeal the best. It seems Eremophilas and Acacias have triumphed with flying colours. Of course, we always knew Acacias were hardy, and some more than others. The biggest surprise for me this season was the resilience of the *Acacia cognata* species, particularly, our newest cultivar, *Acacia* 'Fettuccine'. They look so soft and delicate yet stood up strong as if to say 'Bring it on . . .' they continue to grow lush and bright green. Acacias are simply one of the toughest plants on the planet.

John Facey's recent comment in 'Growing Australian' March edition, sums it up nicely when he says, "I reckon that *Acacia cardiophylla* is so tough and adaptable that it could be grown on the Moon."

We are adding two new features to our newsletters:

WATTLE NEWSFLASH: Includes interesting tidbits and amazing discoveries.

WATTLE RECIPE CORNER: Recipes with wattles in every shape and form. These can be whole seeds, ground seeds, raw, roasted, even wattle flowers.

Please feel free to send me any information or delicious ideas and treats to include in these articles.

Last but definitely not least, I would like to say congratulations to our own newsletter editor Bill Aitchison and to Sue Guymer, as they have been awarded Honorary Life Membership of APS Victoria. Well done and keep up the good work.

Cheers, Esther Brueggemeier

From The Leader

Dear Members,

Over the past few months this great island continent has been engulfed in extreme weather conditions in all parts of the country. Wild floods in the north, violent fires in the south, claiming too many lives, and many disasters in between. Our hearts go out to all victims and families affected. Many are actively supporting the relief work and help has poured in from all over the country as the huge task of rebuilding lives and livelihoods begins.

The intense heat of summer left many of Victoria's gardens wilting away as temperatures soared to 45 degrees plus for too long. With only 5% humidity, many plants, even so

Vale – Irene Cullen

We were recently saddened to learn of the death of one of the members of the Acacia Study Group, Irene Cullen, from Robertson, Queensland. Irene was a Life Member of SGAP Queensland and had been a member of the Acacia Study Group since 1980. Our thoughts are with her family and friends.

Welcome

A special welcome to the following new members and subscribers to the Newsletter:

David & Gabi Fowler, Oxley, Qld
Steven Sharkey, Glenroy, Vic
Simon Walters, Glen Iris, Vic

Feature Plant – *Acacia peuce* (Waddy-Wood or Birdsville Wattle)

by Esther Brueggemeier

Acacia peuce or Waddy-Wood is one of the rarest and most striking trees of the Australian arid zone. A very distinct conifer or she-oak like slow-growing tree with short branches and pendulous branchlets. Large, flat and wavy papery seed pods add to its uniqueness and beauty. It grows on stony wind swept plains in one of the driest regions of Australia.

In such a harsh environment, where the daily temperatures average 40 degrees in January, only a few shrubs and grasses manage to survive. *Acacia peuce* thrives, growing to heights of 15-20 metres and possibly living up to 500 years. One key to the tree's survival is their small spiky needle-like leaves to ensure little moisture is lost.

Acacia peuce is found in only a few places on the borders of the Simpson Desert. It occurs south of Alice Springs towards Andado Station, Northern Territory, and north of Birdsville and near Boulia in Queensland. In the first half of this century many of the trees were cut down to build stockyards and shelters even though Waddy-Wood is so hard it won't even take nails. *Acacia peuce* has a very dense wood that is still used for Aboriginal clubs.

The main flowering, as reported by Simmons, occurs mainly in March and April, although collection records from the Queensland herbarium show it may also flower in August and September. It seems flowering and seed set is closely linked with large rainfall events, after long periods of drought. This may explain why specimens of *Acacia*

peuce in Victoria haven't flowered much, as the dry and wet cycle in the southern climate is very different to its indigenous home. With all the recent climatic upheavals though, this may be an interesting species for Melbourne in the future.

Note: We have recently received a copy of a paper “Population dynamics of a threatened species, *Acacia peuce* (Mimosaceae), at Boulia, western Queensland”, by Hugh McNally, School of Marine and Tropical Biology, James Cook University. Some extracts from this paper are included later in this Newsletter (see page 9).

Small and Interesting Acacias –Part 1

by Neil R Marriott, Stawell, Vic

The following article is based on the talk I gave at the Fred Rogers APS Victoria Acacia Seminar in 2006. Since that time I have grown even more wonderful small acacias and many more interesting ones. This article only discusses those that I consider have considerable horticultural merit. There are literally hundreds more that I have not even tried. Please let me know what your best small and interesting acacias are.

Small Acacias

Acacia acinacea – a small to medium sized highly variable plant. My favourite forms are those that only grow to around 0.3 – 1.0 m high. Some of these are root suckering, forming low dense thickets several metres across after a number of years. This form lives for many decades whereas the non-suckering forms generally live for 10 -15 years. All create a spectacular display of massed yellow flowers during winter – early spring. A wonderful thing about the larger shrubby forms is the way plants can be cut right back to a 10 cm stump during spring or early autumn and they re-shoot vigorously to form a healthy young plant again. All forms are extremely drought hardy.

Acacia congesta – a most beautiful variable stiff low shrub or groundcover from a number of areas in WA. The best form is a dense stiff groundcover that hugs the ground and is covered in massed golden flowers during spring. When in full flower plants often look like a piece of rich velvet material draped over the ground. Can be propagated by cuttings to maintain the low form, although most plants grown by seed remain prostrate. Seed pods are very tiny and curled up and are often hard to see at first glance. Requires a well drained soil, but plants are extremely drought hardy once established.

Acacia drummondii – a most beautiful small shrub from Western Australia where a number of distinct forms can be found. One of the best of these is *Ac drummondii* ssp *major*

which has large coarsely divided ferny leaves and showy large bright yellow rod flowers during spring. It prefers a dappled to semi-shaded site with a cool root run and an occasional summer watering. The very best however is *Ac drummondii* ssp *elegans* which is a delightful dwarf form with beautiful soft grey-green ferny leaves and massed rod flowers. It grows naturally in the Darling Range east of Perth where it grows in dappled shade sites in well drained gravelly loams. In the garden it requires some summer watering to keep it healthy and free flowering.

Acacia flexifolia – a very hardy and attractive small shrub from the drier areas of central Victoria with unusual stem-clasping erect linear leaves, and massed golden flowers throughout winter – spring. It is hardy in a sunny to semi-shaded site and tolerates hot dry summers once established. Can be grown by seed, or by cuttings to maintain good blue foliated forms. Very drought hardy.

Acacia glandulicarpa – ‘Hairy-pod Wattle’ – this rare and wonderful wattle is confined to several limited areas in north-western Victoria where it grows in hard stony clay soils. Under cultivation it is extremely hardy in either full sun or part shade. It flowers so heavily during spring that it completely smothers itself with massed rich gold flowers. These are followed by the most unusual curling hairy seed pods reminiscent of caterpillars. It can be grown by seed or by cuttings. Plants can be cut right back to a stump to rejuvenate plants if they become old and woody. Extremely drought hardy.

Acacia glaucoptera – ‘Clay Wattle’ is a wonderful foliage plant with distinct flattened phyllodes continuous with the stem. The beautiful ball flowers appear like magic from the axils almost at the centre of the flat stems. It is a highly variable species ranging from low forms around 0.5 m and larger forms growing to around 2 m x 3 m. Following research by Bruce Maslin, the dwarf forms common in cultivation have been separated off as a new species *Acacia bifaria*. This species can be identified by its normally green non-glaucous phyllodes that are rounded on the upper (inner) margin of each tip. It also has flexuous stems and is prostrate to semi-prostrate. Furthermore, *Ac glaucoptera* has a distinct dense tuft of white hairs in each axil. Both species have varying levels of bronze-red in their new growth, with the best forms absolutely spectacular when covered in brilliant red new tips. Plants are happiest in heavy well drained soils and are extremely drought hardy once established. *Acacia bifaria* is limited in its distribution from around Ravensthorpe to the Fitzgerald River, while *Ac glaucoptera* is widespread from east of Albany right across to Israelite Bay.

Acacia guinetii – a lovely small rounded shrub to 1.2 m with soft ferny foliage and massed ball flowers during winter-spring. This a very rare plant from near Geraldton in the West, and it is proving to be a hardy and most attractive shrub for sunny to dappled shade sites in the garden. I have found that it can suffer from the heat when planted in an

open west facing site, doing much better with morning sun. Best propagated by seed.

Acacia lasiocarpa var *sedifolia* – this is a big name for a small plant, but a most beautiful low spreading shrub with bright green, ferny leaves and massed bright yellow flowers. Happy in full sun or semi shade, it is extremely drought hardy and can be readily propagated by cuttings or by seed. The picture below was taken by John Barrie of a superb plant growing in alkaline soils in his garden at Coonalpyn, SA. It grows just as well here in highly acid soils.



Acacia lasiocarpa var *sedifolia*

Photo J Barrie

Acacia restiacea – an amazing small leafless shrub found over a wide area particularly in the Northern and Central Wheatbelt regions of WA. Plants look just like a clump of grass or a sedge or possibly even a Restio although I am not sure what species the specific epithet is referring to. In the garden it is a wonderful substitute for Dianellas or Lomandras etc, producing the same attractive upright clumping habit to around 0.5m, but becoming totally transformed during spring when plants are covered in massed ball flowers in short spikes. Grows readily by cuttings of selected clones or seed. Plants prefer an open to dappled shade site in well drained sandy to gravelly loam. Once established they are very drought hardy.

Acacia leptospermoides – another variable low shrub from WA where it can be found growing in dry mallee woodland in heavy sandy clays. In the garden it is a delightful plant with attractive blue to green terete leaves and massed ball flowers during spring. It is readily propagated by cuttings to maintain good selections as well as by seed. Extremely drought hardy in a sunny to dappled shade site.

Acacia nervosa – one of the very best small acacias discussed recently in our ASG newsletter. Promoted for years by Peg McAllister as the best small wattle, I obtained my original seed from Peg. Since then I have grown lots and find that so long as there are several plants nearby they set lots of seed. Peg has had trouble collecting seed from hers so I am now able to give her some back. The pods are

amazing, being very large and fleshy looking until ripe when they rapidly shrink and turn brown and dry. Extremely drought hardy, but preferring a site protected from the hottest afternoon sun, and **totally** covered in rich gold flowers in winter-spring.



Acacia nervosa – one year old plant Photo N Marriott

Acacia spinescens – another beautiful small shrub from very dry inland areas of Victoria and South Australia. Plants are usually found in dry sandy soils and are commonly chewed down into hard small shrubs with terete erect spine-tipped branches and no leaves. During spring it is transformed into a spectacular mass of bright yellow flowers that smother the plant. In the garden it needs regular pruning to replicate the pruning animals give it in the wild. Without this plants become open and spindly. Extremely drought hardy.



Acacia sp nov aff farinosa Photo N Marriott

Acacia sp nov aff farinosa – a wonderful low groundcover from a limited area north of Dadswell’s Bridge east of the Grampians in Victoria. It grows naturally in heavy grey sandy clay in flat Yellow Gum woodland that often becomes flooded in wet winters. In summer, on the other

hand, these sites are dry and rock hard. Plants have only been grown by seed so far, cuttings being untested but probably giving reasonable results. In the garden it grows well in heavy soils and is proving to be very drought hardy as well as tolerating cold wet conditions during winter.

In Part 2, I will talk about some of the interesting medium sized acacias I am growing. I look forward to feedback about other excellent small and interesting acacias.

Cranky Wattles

by Matt Cosgrove, Tamworth, NSW
(Matt is a relatively new member of the Study Group, having joined last year)

What joy and challenges there are to be found in growing wattles. Seeing them in full bloom for the first time is really rewarding, especially when you’ve put the time in to grow them from seed yourself. In my collection so far, I have around 70 species, give or take a couple due to deaths or forgetting where I planted them.

The main reason for me growing acacias is not their flowers but the foliage or in my case the lack of. The more spines, spikes, grass like, or even leafless the more I enjoy them. I do have a few that don’t show those characteristics but they have other attributes to make them worthy of growing in my garden, either for shade, protection, or just because I had a hole to fill and had nothing else to put in.



Acacia decora (with *Hardenbergia violacea*), Photo M Cosgrove

I’ve been trying to grow wattles for a bit over two years now, mostly from seed, but I have also purchased a few in tubes and I’ve been given a couple of others. The most rewarding species for me so far would have to be *A. colletioides*, *A. aphylla*, *A. continua*, *A. tetragonophylla* and my personal favorite *A. erinacea*.

The first of what I call 'cranky wattles' that I planted are *A. paradoxa*. They measure about 2 metres in all directions, beautifully rounded, good in flower. I was wondering if they got to that size due to pampering because the ones in the scrub around here (Tamworth) are more upright and sparse or are there a couple of variations?

The newsletters have been very good and I was very excited to see the photo of the red flowered kangaroo thorn, as well as the seed list. A couple of species that I'm chasing and can't find and would love to have are *A. daviesioides* and *A. argyrodendron*. If any one can help that would be great.

I am really looking forward to increasing my knowledge on acacias and growing techniques with the help of the study group and also sharing ideas and things that have worked for me.

Thanks

Matt Cosgrove

Can anyone help with seed of *A. daviesioides* or *A. argyrodendron*? Note that *A. argyrodendron* is one of the few Acacia species where seed viability reduces rapidly after collection, and should be sown fresh.

We agree with Matt's suggestion regarding pampered specimens of *A. paradoxa* in cultivation – if they are well maintained and pruned, they are likely to be much bushier, compared to more open and sparse plants in the bush.

Notes From Members

Judy Barker (Hawthorn East, Vic) has been growing a number of acacias from seed, and has been testing two different potting mixes (Amgrow Native Potting Mix and Green Wizard Regular Potting Mix) to assess which gives better results. When she runs out of these potting mixes she plans to try Debco Native Potting Mix. In the end Judy hopes to have answered her dilemma as to what to pot into for the best result. If anyone would like to share their views on different potting mixes, please let us know. Judy was a long time member of the Australian Daisy Study Group, and much of her past experience in propagation has been with daisies rather than acacias.

Judy advises that of six species for which she obtained seed from the Study Group Seed Bank, all germinated "to a greater or lesser degree" except for *Acacia nervosa*. She comments that in relation to *Acacia assimilis*, germination results for fresh seed obtained from a friend's garden were much better than for seed obtained from the Study Group Seed Bank.

Another species that Judy has been growing from seed is *Acacia gracilifolia*. This seed was obtained from a plant growing in a friend's garden (Judy advises that she and others who have seen it are enthusiastic about the charms of this species). Seed collected from this plant has germinated very well and Judy has potted on 40 of them. The plant from which this seed was collected is the only one in the area, so this species can be added to the list in ASG Newsletter 103 (see page 6, Seed Set in Acacia). (We would welcome more reports from members as to whether single plants of particular species set seed).

Cathy Powers (Balliang, Vic) draws our attention to an interesting chart highlighting six species of Acacia at http://www.wildlife.org.au/wam_wattles.pdf

Wattle Recipe Corner

This is the first of what we hope will be a regular feature of the Newsletter – recipes based on wattles. If you have any recipes that you would be happy to share, please advise Esther or Bill. In this issue, we feature two original recipes from Vic Cherikoff. Also included is a note by Vic explaining how Wattleccino™ was born (see "An Accidental Discovery" below).

Wattleccino

4 heaped teaspoons Cherikoff Wattleseed
3 cups boiling water
whipped cream

Bring the Wattleseed and water to the boil, then strain the liquid evenly into 4 mugs, top with whipped cream and garnish with chocolate powder or nutmeg. The leftover grounds can be frozen or used as needed in sweet or savoury crumbs, biscuits or muesli. (Serves 4)

Alternative method using a cappuccino machine

1 heaped teaspoonful of Cherikoff Wattleseed

In a cappuccino machine prepare a cappuccino replacing the coffee with the wattleseed. Do not pack down. The grounds expand with heat and can block the hot water flow if too much is used. In addition, if the wattleseed is made too strong it can curdle the milk. Express wattleseed extract to fill ¾ of the cup, top with frothed milk and garnish with chocolate powder or nutmeg. (Serves 1). Try using our Wattleseed extract to simplify the process even further.

Wattleseed cream

Cream enhances the coffee, chocolate and hazelnut taste of Cherikoff Wattleseed and is best unsweetened, since sugar tends to over-power the flavour of Wattleseed. Besides, the desserts that Wattleseed cream garnishes are usually sufficiently sweet.

In addition, another use of unsweetened Wattleseed cream is to thicken and flavour savoury sauces, particularly mushroom but anywhere you need to add a healthy dose of maillard products for their nutty, roasted, toasty flavours.

**300ml thickened cream, whipped to firmness
1 tablespoon Wattleseed and 50ml water
or use Wattleseed extract**

Boil the Wattleseed and water in a microwave (easily done in a jar – without the lid), watching to stop the mixture from boiling over. This slurry can be kept chilled almost indefinitely. Cool slightly and add some of the liquid and as much of the softened grounds as is visually appealing, into the whipped cream.

If you are using Wattleseed extract, it is easy to add it before whipping the cream and using enough to get a light tan colour.

Wattleseed cream is best after a day in the refrigerator/chiller as this allows the flavour to develop more fully. In addition, Wattleseed cream, once whipped, will store chilled for up to a week. The Wattleseed will hold the whip and stop the cream from splitting.

For more info on Vic Cherikoff – Australian Ingredients go to www.cherikoff.net/shop

An accidental discovery

by Vic Cherikoff

Let me tell you about the modern use of wattle seed and how it came about. I was preparing the seeds from 4 or 5 wattle species I'd had sent in from Central Australian Aboriginal communities with whom I was working on the nutritional analysis program at the University of Sydney. The Aboriginal women had sent in raw seeds and while these were useful to analyse, we also needed the seeds as prepared ready to eat.

And so it was that I found myself roasting the seeds in a saucepan on my kitchen stove. I heated the seeds while tossing them around and heard a few popping noises as the seeds super-heated inside their seed coat and then suddenly released the energy as the seed coat popped.

And then the phone rang.

I put the saucepan to the side of the hotplate and went to answer the phone, thinking that we are very well trained to answer its urgent demanding ring. Anyway, after I returned to the seeds, I found that they had continued to roast on in the pan and now looked very heavily roasted indeed. After an expletive or two, I thought that I had better see if these 'over-cooked' seeds would grind more easily than the raw seeds (remember, which tend to squash more than grind to a meal). I transferred the roasted seeds to an electric coffee bean grinder and gave them a spin before taking off the top to look at how they'd ground up.

Well! The aroma!

Up came this incredible, coffee, chocolate, hazelnut, toasty, roasted flavour which was just superb. I knew instantly, that I'd discovered something really special and noted that September day of 1984 as auspicious. I ground the seeds up more and then tried the dark brown, coffee-like grounds in my stove-top cappuccino machine. As the rich extract poured through, I tried it black and then with milk, which I much preferred and with a topping of frothed milk: the world's first Wattleccino™ was born. It was delicious with the milk (or cream) bringing out a sweetness in the product I now call Wattleseed. It even worked with a small amount of coffee added and this extract, which we now manufacture using state of the art, counter-current extraction technology, has been proven as a fantastic flavour for cream, ice cream, nut butters, sauces and in beverages.

And so we have the tiny, black wattle seeds from Acacias growing in the arid Central Australian deserts now harvested for their bounty of what is essentially, a coffee substitute. Picking wattle seeds in the desert in 40 to 50°C (100 to 110°F) may not be as romantic a notion as hand-picked coffee berries from rainforests of New Guinea, South America or Ethiopia but the extremes cannot fail to impress.

A hint when using the grounds is to begin to extract the flavour and soften the grounds in water by boiling the small quantity you need for a particular recipe. Like the roasted and ground Wattleseeds, Wattleseed extract, which is a water-based concentrated 'espresso', can be used in a multitude of ways. The extract is just the ready-made product with the grounds removed. The extract also has an emulsifying action and is an effective stabiliser for whipped cream, nut butters and some oil and water mixtures (sauces, particularly emulsion sauces, dressings etc).

Add Wattleseed to whipped cream, ice-cream, pancake, bread or muffin mixes, pasta, chocolate and chocolate fillings, biscuits and beverages (my Wattleccino™ is simple to make with wattleseed extract – just add hot water and frothed milk). Also use as a flavouring for beer, cream or red wine sauces, in marinades and dessert sauces. Approximate usage rate is from 2-3%, depending on the flavour of other ingredients and whether the wattle is enhancing or competing with these other tastes.

Wattleseed as medicine and nutrition

My work at the University of Sydney's Human Nutrition Unit in the 1980s (doesn't that make me feel old with 25 years under the belt) analysing native Australian ingredients for their nutritional profiles showed that wattle seeds have a high protein content, variable but polyunsaturated fat content and carbohydrates of such complexity that they can be considered slow release. Foods utilising wattle seeds typically exhibit a lowered glycaemic response. This means that the edible species of wattle seeds are generally highly nutritive and recommended as part of a mixed diet, particularly for those maintaining a low CHO or low GI focus.

The fats in wattle seeds are typically 5 to 10% of the raw seed weight but there is an interesting point to note here. Many Acacia seeds have an appendage known as an aril which is a structure which holds the seed in the pod. The arils can vary in colour from light tan to bright yellow, orange or red. No studies have been conducted on the pigments which are probably carotenoid compounds which are related to and often precursors of vitamin A. What we do know is that the arils are very high in polyunsaturated oils and many taste absolutely delicious. In fact, some species were used by Aborigines to flavour their drinking water. The whole seeds, with arils attached, were immersed in water and worked through the fingers to almost homogenise the fats into the water. It certainly flavoured the water and I can best describe the taste as close to the toasty notes of just baked bread, but with a range of interesting aromatic flavours, again, depending upon the species.

I have tried around 14 different wattle seed cakes and all had a pleasant taste which varied depending on the species of Wattle (Acacia) used. Some were very oily, fragrant flavours ending up tasting almost like a spiced, gluten-free bread while others were more like a plain damper or unleavened bread made from barley more than wheat flour. Others came closer to buckwheat, quinoa and other grain breads. But whatever the flavour, there is little doubt that before too long, Wattleseed will soon become common ingredients on menus and in bakeries around the world and then creep into the commodity market just like soy, corn, rice and wheat.

Acacia Flour

Still on the subject of food, we received a question from Katherine Favero (NSW). Katherine writes as follows:

"I'm doing some research into acacia flour in regards to gluten free flours. I came across the Acacia Study Group newsletter and thought that you might be able to help or point me in the right direction. I was wondering if you had any information about acacia flour. I have already

contacted a few suppliers but any information I could get would be helpful. I can't seem to find anything about its nutritional value or much information about it generally."

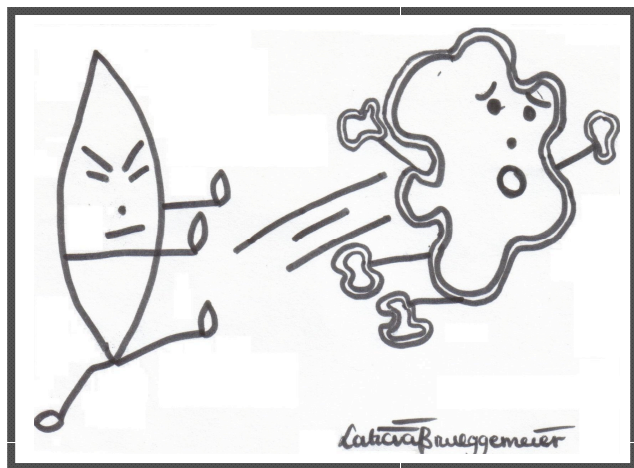
We referred Katherine's question to **Peter Yates**, a bush food promoter and expert from Alice Springs. Peter commented as follows:

"Acacia seed is free of gluten. Protein content ranges across species from about 17% to 30%, with the median being around 23%.

I have amino acid profiles for *A. colei* and *A. coriacea*, though they are not easily to hand as I write. More generally, *Acacia colei*/100g; Energy: 1246kj, Protein: 23.8g, Fat total: 11g, Carbohydrate: 57.1%, Sodium: 12mg.

I have used acacia seed in bread with very good results. I have never had good results introducing acacia seed to bakers however, who tend to think in very small circles, be constrained by narrow margins, and have very limited conceptions of what "bread" can and should be. A pity, because my wattleseed bread has a passionate following in Alice Springs, and if this could be re-created on a larger scale on the east coast, then good livelihoods would flow to Aboriginal collectors in remote Central Australia.

I prefer *Acacia colei*, a small seeded tropical species. The flavour is good, and the seed has a thin, relatively soft seed coat that is not gritty in bread, as can be the case with the more commonly used *A. victoriae*. It is also a prolific seeder and easily collected. I use a coarse grind (of *A. colei*) of roasted seed, and add between 4-8% of this to a light rye base. It does not go so well with sourdough. The flavours seem to clash."



Note: Laticia Brueggemeier is the 11 year old daughter of Study Group Leader Esther. Laticia enjoys drawing cartoons, and this one shows a wattle seed attacking a bad cancer cell. Our thanks to Laticia for this cartoon, and also the one on the next page. Of the many wattles in her parents garden, Laticia's favourite is silver wattle (*A. dealbata*), as this is the best tree for climbing.

WATTLE NEWSFLASH (1) Cancer Fighting Wattle Seeds

During Esther's contact with Vic Cherikoff there was mention of an amazing nutritional discovery. The following is an excerpt from his email.

"Recent research into the sugars in extracts from selected wattle seeds has yielded some very interesting results: One particular species (at this stage, still a company secret until more work proves the real commercial value of this finding) appears to contain almost every naturally occurring sugar including pentoses and hexoses (5 and 6 carbon molecules). The relevance of this is currently in the therapeutic realm of improving the efficacy of anti-cancer drugs to which cancer cells appear to have some immunity. Several sugars are able to bind with proteins to inhibit this immunity and therefore render the cancer cells susceptible to a wider range of therapeutic drugs.

Still other compounds in wattles are able to turn on apoptosis in cancer cells. This is often described as the 'Use by' date of cells and reflects the fact that while ordinary cells in all of our tissues are genetically programmed to last a certain time (as little as 7 days for some cells), cancer and tumor cells lose this death date and continue to grow unabated. A class of compounds in wattles is under scrutiny as a natural means of controlling mutant cells.

Could it be that a diet high in traditional forage foods as in those fruits, herbs, spices and nuts with which we evolved

over millennia, is exactly what we need to maintain our ideal nutrition?"

Vic Cherikoff

WATTLE NEWSFLASH (2) Talking Wattles

Lou-Nita Le Roux (South Africa) has written to us as follows:

"I have heard a story told in South Africa that African Acacia trees can communicate with the aid of chemical messages sent through the air currents that move unseen around us.

This is how it works: an animal walks up to an Acacia and starts nibbling on the leaves. For a while it is sweet, but shortly it turns bitter and the animal moves on. The tree feeling under threat from the loss of leaves produces a chemical called tannin, which is bitter tasting and poisonous.

The threat against the tree prompts it to release a chemical message, called a pheromone, into the air. This chemical message is carried on air currents to the nearest Acacias, where it is picked up by small chemical receptors in the leaves. The tree interprets it as a warning and starts releasing tannins into its leaves to protect itself against the impending danger.

Is there any truth in this story?"

Esther comments as follows:

Conservationists in South Africa were alarmed when large numbers of kudu (an African antelope with spiral horns) began dying of starvation on the small reserves, with plenty of Acacia trees for them to nibble on.

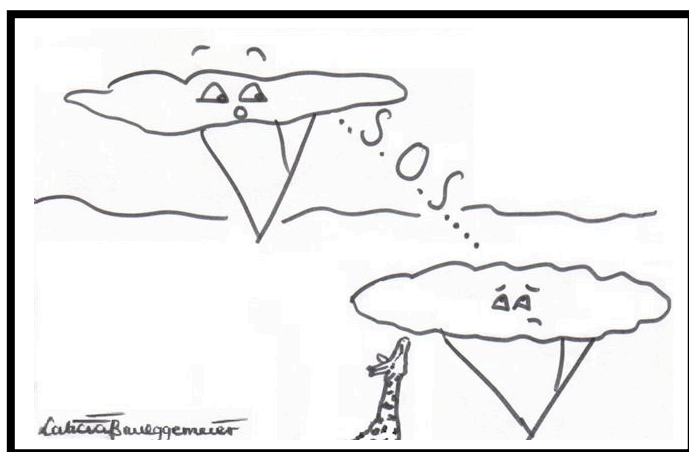
After much research and investigation, the experts say we have a case of 'talking trees'!

The South African Panorama reports: "Acacia trees have a secret weapon against kudu and other leaf eaters. When a kudu grazes from a tree, the leaves are stimulated to produce a form of tannin known as Tannin K."

Professor Wouter van Hoven claims in Custos magazine that "it was recently proved beyond doubt that when a plant's leaves are injured, aromatic compounds are released into the air to which other plants of the same species are sensitive." In effect, Acacias being grazed warn their neighbours of hungry browsers. Tannin levels rose sharply over a 15 minute to 1 hour period of all surrounding trees,

(van Hoven 1991) therefore 'shutting down' the Kudus' food supply.

Subsequent studies have shown that in the wild after grazing on the trees, Kudu move quickly to trees much further away from those recently grazed. However, because of the enclosures these animals were forced to consume more of the foliage from one woodland. FAO (Food & Agriculture Organisation of the United Nations) states "This obviously has been an important survival mechanism for trees on the savannahs. Also it has major implications for the use of browse trees in pasture/tree associations for cattle production." If there are more kudu fenced in, it is advisable to provide them with food supplements in winter.



Of course, it will be necessary to investigate these findings under natural conditions before it is known for sure how *many* trees really "talk" and to what extent. Nevertheless, these results point to awesome intelligence and incredible design.

References:

Van Hoven, W. (1985). The tree's secret weapon. South African Panorama 30(3), 34-37.

Van Hoven, W. (1991). Mortalities in Kudu (*Tragelaphus strepsiceros*) populations related to chemical defence of trees. *Revue de Zoologie Africaine* 105, 141-145.

Footnote: Do we have any Australian examples of this phenomenon of "talking wattles"? Please let us know if you have any thoughts in relation to this. Note that the matter is also referred to in Jacobson's Organ and the Remarkable Nature of Smell, by Lyall Watson (published by W W Norton, 1999).

Acacia peuce

We have included below some selected extracts from a paper, Population dynamics of a threatened species, *Acacia peuce* (Mimosaceae), at Boulia, western Queensland, by Hugh McNally, School of Marine and Tropical Biology, James Cook University. If any Acacia Study Group member would like a copy of the complete paper, please contact either Esther Brueggemeier or Bill Aitchison. The photos of *A. peuce* are provided by Hugh McNally.

Abstract

"*Acacia peuce* is a rare tree species of the Australian arid zone. A listed species under the EPBC, 1999, it is known from only three limited populations. Two of these populations appear extremely vulnerable. This study considers the dynamics of the population near Boulia in western Queensland, the largest remaining population of the species, and probably the key to the conservation of the species. The recruitment and growth of new cohorts in the population over the last 35 years is examined, and supports the current belief that effective recruitment is contingent on significant rainfall events. The distributions of individual trees at various locations within the population are also analysed, and indicate that there is significant variation in the distribution of trees within the landscape, a difference which appears to be related to the soils at the site. The size distributions of three distinct growth stages are also examined, with mixed results. The size distributions of the current population are compared to figures for the 1980 population, and this comparison indicates a marked change in the age structure of the population in the intervening period. The reproductive strategies and environmental constraints on the population are also discussed, as are the issues related to cattle grazing in the area. The study concludes that the Boulia population of *Acacia peuce* is extremely healthy, and probably currently exceeds the carrying capacity of the landscape, which is strongly constrained by the distribution of soils in the region. The study also identified an *Acacia peuce* which appears to record one of Burke and Wills campsites, in the region where Wills became the first European to describe the species."

Aims

"The purpose of this study is to consider the factors governing the recruitment, population structure and distribution of *Acacia peuce* at Boulia, and in so doing to consider its long term viability in the region. Evident within the population at Boulia are apparently distinct height classes which are hypothesised to be cohorts representative

of distinct recruitment events. Local knowledge suggests that major recruitment coincides with significant rainfall events, and that prior to a record flood in 1974 this population consisted almost exclusively of scattered adults. One objective of this study is to attempt to relate the size classes of the younger *Acacia peuce* at Boulia to flood records, and from this identify the relationship between rainfall and recruitment within this population. The distribution of trees within the population is also examined using development stage, diameter at ground level (DGL), and spatial relationships. The relationship between DGL and development stage is also analysed. The size distribution of the current population is compared to the 1980 distribution, and the boundaries of the main stand are mapped. The study uses data collected during April and September, 2007.”

Distribution

“*Acacia peuce* is a rare tree of the Australian arid zone, listed as ‘Vulnerable’ under the Environmental Protection and Biodiversity Conservation Act, 1999 (Dept of Environment and Water Resources). It is currently known to occur at three locations. The smallest of population occurs at Mac Clarke Conservation Reserve on Andado Station in the Northern Territory, while another is located north of Birdsville on Roseberth Station in south-western Queensland. By far the largest and most robust population occurs on Montague Downs and Mudgeacca Stations, south of Boulia in western Queensland. A census of the three populations in 1980 found approximately 2,000 plants at Mac Clarke Conservation Reserve, 15,000 to 20,000 plants at Birdsville, and over 100,000 plants at Boulia (Deveson 1980). The distribution of these three populations around the fringes of the Simpson Desert indicates that they may represent remnants of a formerly continuous population which has been steadily subsumed by the development of the desert, and the Birdsville and Mac Clarke populations appear extremely vulnerable to increasing aridity.”

“The population of *Acacia peuce* at Boulia occurs predominantly in a single large stand approximately 14km long and 3 to 4km wide running north-south from the southern end of Goodwood Station, across Monatgue Downs and ending on Mudgeacca Station. The stand straddles Coorabulka Rd, and occupies an area centred at approximately 23° 02’ S x 139° 54’ E, and lies on the floodplains to the east of the Burke River. Located in the Southwestern Downs sub-region of the Mitchell Grass Downs Bioregion (Australian Natural Resources Atlas), it is classified as Regional Ecosystem 4.3.21 - *Acacia peuce* open woodland on alluvium (Qld Environmental Protection Agency). It is this alluvial landform which appears to define the distribution of *Acacia peuce* in this region. The stand is surrounded on all sides by Mitchell grass downs on deep cracking clays, however the area occupied by *Acacia peuce* consists of texture contrast duplex soils with loose sandy or

powdery loam A horizons over massive or weakly pedal calcareous clay B horizons (Deveson 1980; pers. obs.). The boundary between soil types is often quite abrupt, and as a consequence the boundaries of the population are mostly quite distinct. Small stands of the species are also scattered along the channels of the Burke River (Deveson 1980), and they are also well represented in mixed vegetation along drainage lines in the region (pers. obs.).”

Unusual Attributes

“Apart from its relative rarity, *Acacia peuce* exhibits a number of unusual attributes, including a rare ability as a tree to survive harsh, arid environments. At Mac Clarke Conservation Reserve and Birdsville it continues to survive and reproduce with mean annual rainfall of less than 175mm and average summer temperatures approaching 40°C (July 2007), and is the only tree growing at either location (Deveson 1980). Their growth habit is also striking. After germination the plant develops as a ‘cushion’ approximately 50cm diameter and 30cm high, with a dense covering of stiff, pungent phyllodes approximately 50mm long. The plant then grows vertically, with similarly unfriendly foliage, to a height of approximately three metres. At this point it begins branching to form an open canopy, and the higher foliage develops as fine, pendulous phyllodes very similar to the cladodes of *Casuarina* species, for which the adult trees are often mistaken. As a consequence they exhibit three distinct growth forms, with upright juveniles exhibiting only stiff, pungent phyllodes, open adult trees with fine, pendulous foliage, and an intermediate stage where both foliage types are evident.

Seed development and dispersal are also unusual in *Acacia peuce*. Seed pods are unusually large, being up to 200mm long and 50mm wide. Analysis during the current study indicates that they contain an average of less than two viable seeds, again unusual in *Acacia*. Unlike most *Acacia* species, the seeds are retained in the seed pods, and the pods shed from the trees intact. Observations during this study suggest wind is a major factor in the dispersal of these pods, with pods moving readily around the site in moderately strong winds, and accumulations of pods noted against low obstructions. Locals also recount that pods are prominent in flood waters (Pip Prince & Dick Suter, pers. comm.). The seeds of *Acacia peuce* lack the resistant coating and eliasomes of many *Acacia* species, which are typically related to the development of a soil seed bank (Auld 1995). In *Acacia victoriae*, for example, which co-occurs with *Acacia peuce* at Boulia, soil seed banks of up to 3,200 seeds per square metre have been recorded (Westoby and Grice 2006). Analysis of 25 soil samples collected during this study failed to identify a single seed. A small germination trial with seed collected during the study suggests that the only requirement for successful germination in this species is adequate water. The seeds of *Acacia peuce* are also unusually large, with an average mass of approximately 0.1g each. Other arid zone species such as *Acacia aneura*

and *Acacia cambagei*, by comparison, have seeds less than a quarter this size (Deveson 1980).



Acacia peuce is also appears to be an ancient and largely unique species within the genus. Its closest relatives are likely to be *Acacia crombiei* and *Acacia carneum*, another two rare species of the arid zone (Luly 2007). *Acacia crombiei* is restricted to disjoint stands north of Richmond in western Queensland, and *Acacia carneum* occurs only on sandy hills and plains in north-western New South Wales and north-eastern South Australia. The three species are unique among the *Acacia* in the production of peltogynoids, a family of chemicals otherwise found only in the Caesalpiniaceae (Tindale and Roux 1974). This appears to indicate that the three species may well represent a very basal lineage within the *Acacia*, however despite the three species also sharing several morphological characteristics their relationships remain unclear. These unique characteristics further enhance the conservation value of *Acacia peuce*.”

Recruitment

“Regression analysis of the relationship between tree height and flood events for the younger *Acacia peuce* at Boulia strongly supports the hypothesis that there is a distinct relationship between recruitment in the population and major rainfall events. The six metre cut-off for tree height in the cluster analysis is supported by the fact that size classes above this have relatively small numbers, and the inclusion of trees to seven metres tall resulted in a largest size class of only eight trees. Given that this cluster should represent a major recent recruitment event also supports the hypothesis that these larger trees represent the trees present prior to the 1970’s. The two larger clusters were combined the 1974 and 1977 events as it is improbable that after 30 years you would be able to distinguish between events separated by only three years. Figure 14 also supports this course of action. This chart represents the flood record for the Georgina River at Marion Downs, forty kilometres south of Boulia, and below the confluences of the Burke and

Hamilton Rivers (the Hamilton runs in an arc to the east and south of the *Acacia peuce* population at Boulia.) Although these records can’t be correlated directly with Boulia, they suggest that the 1970’s was a period of abnormally high rainfall in the region, and recruitment during this period probably represents something of a continuum. Regular rainfall would also have enhanced the establishment of seedlings otherwise vulnerable to desiccation. The combined clusters representing the older cohort were analysed against an age of 32 years. The four metre cut-off for flood levels was used due to its classification by the Bureau of Meteorology as a threat to crops or grazing at Boulia.”

Discussion

The life history strategy of *Acacia peuce* appears well adapted to its environment, and in particular to extended drought punctuated by large rainfall events. Adult trees appear to be quite long lived, and carbon dating analysis of a 40cm DBH specimen from Boulia indicates an age of 150 years (Deveson 1980). As part of the current study carbon dating was undertaken on similar sized specimens from Birdsville, indicating an approximate age of 200 years. (Further samples from Boulia have been sent for analysis, however the results have not been received at this time.) Although this is not as old as had been speculated, it is still venerable. Trees were surveyed during this study over 75cm DGL, suggesting that they may live for up to 400 or 500 years. (It is worth noting here that longevity is another attribute not typically associated with Australia’s *Acacia*.)

During the first visit to the site in April, a number of older trees were carrying dried seed pods, with a maximum recorded load of over 400, and a handful of them exhibited sparse flowers. By the time of the return visit in September none of these pods appeared to be retained on the trees, however the majority of trees with adult foliage were carrying heavy loads of new pods and/or were flowering profusely. There is little information available on the flowering of *Acacia peuce*, although the management plan for the species in the Northern Territory suggest that the Mac Clarke population flowers from October to March (Northern Territory Parks and Wildlife Commission). Curiously it also appears to assume that they recruit from a soil seed bank, quoting several texts on the recruitment of other arid zone *Acacia* species. This is despite the almost complete loss of an isolated stand of the trees at Mac Clarke Reserve as a result of fire in 1976, with a complete absence of the germination typically triggered by fire in *Acacia* exhibiting soil seed banks (Auld and O’Connell 1991; Auld 1995). While it is difficult to draw a conclusion based on a single season it appears that the species instead relies on a massive seed rain immediately prior to and during the wet season. The unusual investment in fewer but larger seeds in relation to its genus suggests that it maximises seedling establishment after germination rather than maximising recruitment numbers. It is also worth noting that even on trees with mixed foliage, flowers and seed are almost never

seen on juvenile foliage. Of the 171 trees represented in the cluster analysis of trees below six metres tall, only 21 exhibited adult foliage, suggesting a minimum reproductive age of approximately 30 years.”



Cattle and *Acacia peuce*

“The Northern Territory management plan suggests that cattle pose a significant threat to *Acacia peuce* (Northern Territory Parks and Wildlife Commission). This may be an issue at Mac Clarke Reserve, however there is little evidence to support this theory within the Boulia population, which occurs on active cattle grazing properties. Despite spending many days observing trees within the population, and actively looking for the potential impacts of cattle, the only evidence observed of likely impacts were very limited browsing of new adult foliage on a single mature tree, and one cushion type juvenile which had apparently been trampled but was still alive. These observations are testament to the effectiveness of the species’ defences against herbivory. Even in areas where every blade of grass had been grazed the juvenile plants appeared untouched, and in areas around bores where the ground surface had been trampled to dust even the cushion type juveniles were unaffected, suggesting that the cattle have a healthy respect for the plants’ defences. It is also noteworthy that fully developed adult foliage within browsing range of cattle remained untouched. Given that cattle are known to eat *Acacia cambagei* when hungry enough, despite its irritant effects on their digestive systems (Jon Luly, pers. comm.), this raises the question of whether the physical defences of *Acacia peuce* are supplemented by chemical defences. One potential impact of cattle is on the seedlings of *Acacia peuce*, which lack the defences of the older plants. It seems likely, however, that a plant specifically adapted to herbivory would also be adapted to deal with this eventuality, and it may well be the grazing of these shoots which triggers development of the cushion form of juvenile. This hypothesis could be tested during germination trials. One apparent benefit of cattle sharing the landscape with *Acacia peuce* at Boulia is the creation of

footprints in wet soils, which act as traps for the windblown seed pods, a phenomenon observed a number of times. These footprints are likely to act as miniature reservoirs after rain, enhancing the germination and subsequent survival of trapped seeds. Cattle may also benefit the survival of the species through grazing, which will help limit fuel loads and lower the potential for serious fires such as the one which destroyed 200 *Acacia peuce* at Mac Clarke Reserve in 1974. Feral camels are also known to browse *Acacia peuce* at Mac Clarke Reserve (Dorges and Dance 2003), and they also occur at Boulia. Their numbers are fairly limited, however, and it is unlikely that they pose any threat to the species at Boulia.”



The ‘Burke and Wills’ tree

“Another interesting aspect of the second visit was the revelation by Pip Prince that an *Acacia peuce* on Montague Downs appears to carry a blaze marking it as a campsite of the Burke and Wills expedition. This tree was inspected during the trip, and although much of the blaze is now overgrown, the ‘B’ (for Burke) which characterised these blazes is still clearly visible. The first recorded European description of *Acacia peuce* was in fact by W.J. Wills during this expedition, on January 8th 1861 near Campsite 88, 23°S x 140°E (Appendix). This location clearly corresponds with the population at Boulia, and this may well have been the tree described. Seed was collected from the blazed tree with the intention of growing and conserving its offspring, and further attempts will be made to verify its authenticity. It is also worth noting that if it is genuine, this tree must already have been a substantial tree when it was blazed 146 years ago, and it is currently 490mm DGL. It is an interesting coincidence that the species was formally described using a sample collected from the Birdsville population during the search for Burke and Wills (Grandison 1980).”

Conclusions

“As noted earlier, *Acacia peuce* is a listed species under the EPBC, 1999. This is due in part to its restricted distribution,

but also to the tenuous existence of the populations at Mac Clarke Conservation Reserve and Birdsville. Both of these populations now lie on remnant landscapes within the dunefields at the fringes of the Simpson Desert, and assuming that the conditions which produced the desert are ongoing, their future is questionable at best. For this reason the health of the population at Boulia may well be critical to the long term survival of *Acacia peuce*. Building on the work of Deveson in 1980, the current study appears to support the conclusion that the population of *Acacia peuce* at Boulia is in excellent condition, largely as a consequence of recruitment triggered by a series of significant rainfall events over the last thirty five years. Cattle grazing appears to have minimal impact on the population, and it is reassuring that the core population at Boulia appears to be at or above its long term carrying capacity given the constraints of its environment. The isolated stands along the Burke River to the south of Boulia, and the trees present in the bands of vegetation occurring on drainage lines and palaeochannels in the region also enhance the prospects of successfully conserving the species.”

Details from William Wills’ Field Book No. 4, entry for January 8th, 1861.

“To the north of the creek the country undergoes a great change. At first there is a little earthy land subject to inundation. The soil then becomes more sandy, with stony pans in which water collects after rain; the whole country is slightly undulating, lightly timbered, and splendidly grassed. A number of small disconnected creeks are scattered about, many of which contained water protected from the sun and wind by luxuriant growth of fine grasses and small bushes. We passed one or two little rises of sand and pebbles, on which were growing some trees quite new to me; but for the seed pods I should have taken them for a species of Casuarina, although the leaf-stalks have not the jointed peculiarities of those plants. The trunks and branches are like the she oak, the leaves like those of a pine; they droop like a willow, and the seed is small, flat, in a large flat pod, about six inches by three-quarters of an inch.” (State Library of Victoria)

“To anyone familiar with the site this description of both the landscape and the tree will be immediately recognisable.”

References

- Auld TD, (1995) Soil seedbank patterns of four trees and shrubs from arid Australia. *Journal of Arid environments* **29**, 33-45.
 Auld TD, O’Connell MA, (1991) Predicting patterns of post-fire germination in 35 eastern Australian Fabaceae. *Australian Journal of Ecology* **16**, 53-70.
 Australian Natural Resources Atlas V2.0
http://audit.deh.gov.au/ANRA/vegetation/docs/Native_vegetation/nat_veg_appendix3.cfm

Bureau of Meteorology:

<http://www.bom.gov.au/hydro/flood/qld/brochures/georgina/georgina.shtml>

Department of Environment and Water Resources: ‘*Acacia peuce* — Waddy, Waddi, Waddy-wood, Birdsville Wattle’

http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=8301#distribution

Deveson E (1980) ‘An inventory of *Acacia peuce* (F. Muell.) stands in central Australia: Biogeography and ecology.’ B.A. Honours Thesis, Australian National University, 114pp.

Dorges B, Dance B, (2003) ‘The palatability of central Australian plant species to camels.’

www.nt.gov.au/dpifm/Primary_Industry/Content/File/TN116.pdf

Environmental Protection Agency, Queensland:

<http://www.epa.qld.gov.au/projects/redd/index.cgi?reid=4.3.21>

Grandison R (1980) The identification of the type locality and collector of *Acacia peuce* F. Muell. *Journal of the Adelaide Botanic Garden* **2**, 221-227.

Northern Territory Parks and Wildlife Commission, 2003: ‘A management program for Waddy-wood (*Acacia peuce*) in the Northern Territory of Australia (Draft).’

http://www.nt.gov.au/nreta/wildlife/programs/public/pdf/acacia_peuce_management_plan.pdf

Grice AC, Westoby M (1987) Aspects of the dynamics of the seed-banks and seedling populations of *Acacia victoriae* and *Cassia* spp. in arid western New South Wales. *Austral Ecology* **12**, 209-215.

Luly, Dr Jon, School of Earth and Environmental Sciences, James Cook University.

Luly J (2007) ‘A compendium of current wisdom regarding the Waddi tree (*Acacia peuce*).’ In the Field Handbook for BT3010, The Biology of Plant Survival, James Cook University.

Prince, Pip, owner of Mudgeacca and Montague Downs stations. State Library of Victoria, William Wills Field Book No. 4. Entry for the 8th January, 1861.

http://victoria.slv.gov.au/burkeandwills/archives/science/wills_fieldbooks/wills/willsfieldbooks4.html

Suter, Dick, curator of the Stone House Museum, Boulia.

Tindale M and Roux D (1974) An extended phytochemical survey of Australian species of *Acacia*: Chemotaxonomic and phytochemical aspects. *Phytochemistry* **13**, 829-839.

Note: Hugh McNally has also provided to us a copy of an essay that he has written, “The history and biogeography of *Acacia* in Australia with special reference to the appropriateness of using *Acacia pycnantha* as Australia’s National Floral Emblem”. We will include excerpts from this in our next Newsletter. In the meantime, if any Study Group member would like a copy of this please advise Esther or Bill.

Study Group Photo Library

Our thanks to Nita Lester (Annerley, Qld) for donating a number of photos, taken at Myall Park, to our Study Group Photo Library. The collection includes 116 images, covering 29 taxa. One of these photos is shown below – *Acacia cyperophylla* is one of the species that has very decorative miniritchi bark. The 29 taxa are as follows:

acuminata, aneura var. aneura, aprepta, burbidgei, catenulata, chrysellia, craspedocarpa, crassa, cyperophylla, deanei ssp deanei, dempsteri, farnesiana, gnidium, grandifolia, iteaphylla, jucunda, kempeana, linophylla, multispicata, oldfieldii, papyrocarpa, paraneura, ramulosum var. linophyllum, rhigiophylla, rhodophloia, semilunata, shirleyi, spectabilis, wardellii



Acacia cyperophylla

Study Group Membership

Acacia Study Group membership for 2008/09 is as follows:
\$7 (newsletter sent by email)
\$10 (hardcopy of newsletter posted in Australia)
\$20 (hardcopy of newsletter posted overseas)

Subscriptions may be sent to:
ASGAP Acacia Study Group Leader
Esther Brueggemeier
28 Staton Crescent
Westlake, Victoria 3337

Subscriptions may also be paid directly to our Account at the Bendigo Bank. Account details are:
Account Name: ASGAP Acacia Study Group
BSB: 633-000
Account Number: 130786973

If you pay directly to the Bank Account, please advise Esther by email (wildaboutwattle@iprimus.com.au)

Seed Bank

An updated list of species held in our Study Group's Seed Bank was included in Newsletter No. 102 (September 2008). Requests for seed should be directed to Esther.

18 packets maximum in each order (negotiable). Limit of 3 orders per member per year. Please include \$2 in stamps to cover the cost of a padded post bag and postage.