

about pasture development in the tropics and subtropics

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## Pasture Fight Back – Leucaena and the environment

**Tropical Grassland Society Presidential Address – Col Middleton**

Some 60,000–80,000 ha of leucaena have been planted so far, and it has a bright future in northern Australia on the soils to which it is adapted. Not only is it our highest quality forage, it is also an economical and sustainable production system. We can add to this its environmental positives associated with improving soil fertility, controlling erosion, lowering of water tables, preventing salting and accumulating carbon.

The positive benefits of cultivated leucaena to the community far outweigh any current and potential negative environment effect.

If a significant weed problem in urban areas is perceived, then we should support action to control it. However, action should not include unnecessary restrictions and controls over the grazing industries that clearly have so much to benefit from leucaena use. The improved varieties have not been a major contributor to the weed leucaena problem.

I use leucaena as an example of the underrated positive community value of exotic plants. There are many other exotic pasture plants out there making big contributions to the grazing industries. They are all likely to be targeted as undesirables by some 'conservationists'.

As an organisation, TGS must be proactive in championing the positive values of pasture plants, both native and exotic, and their sustainable use and management.

### Why do we need exotics?

It is about six or seven decades since scientists in Australia began a serious campaign to complement native pasture and the handful

of useful exotic pasture plants (paspalum, rhodes grass, kikuyu etc.) grown mostly on the fertile soils. The major thrust for the development of introduced plants occurred in the 1960 to 1990 period. Several thousand introductions were screened and many highly useful grasses and legumes were commercialised. The emergence and development of the Tropical Grassland Society closely followed this enhanced sown pasture activity.

The need for exotic plants is quite simple. The beef industry in northern Australia contributes greatly to the prosperous development of our society. Even today, the beef industry in Queensland contributes about 35% of Queensland's export income. While native pasture remains the major forage source (on an area basis), the ever-increasing demand for higher quality and younger beef has increased the need for higher quality diets that only exotic forage plants can provide. We would lose the ability to service almost all export markets without access to cost-effective, high-quality exotic pastures.

Up to the present time, nearly 15 million hectares of introduced pasture have been sown. This includes about one and a half million hectares of introduced legume.

### But exotic pasture plants are weeds!

There is increasing 'popular press' criticism dumped on the grazing industry and sourced from so called 'conservationists'. Rarely based on science or fact, they promote to the community that all exotic pasture plants are 'weeds'. Given the liberal and arbitrary definition of a 'weed', it is inevitable  
*Continued on page 3.*

*TGS must be  
proactive in  
championing  
positive values*

*Does political  
correctness stifle  
science?*

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## Society News

Note our  
new Web  
address

### Our Internet address

Our old Web address of [www.powerup.com.au/~tgsoaust](http://www.powerup.com.au/~tgsoaust) was difficult to remember so we now have a shorter and friendlier (and more expensive) address:

[www.tropicalgrasslands.asn.au](http://www.tropicalgrasslands.asn.au)

for membership forms, the book list and conference details.

e-mail: [tgs@tag.csiro.au](mailto:tgs@tag.csiro.au)

Newsletter on the Net – see page 5.

### New subscription rates

From 2001, some of our membership and subscription rates will increase. They have been steady for a couple of years. Printing costs have been fairly well contained, postage has increased considerably and now we have to pay GST on all services.

We have an ABN, but are registered as an 'Income Tax Exempt Charity', so we do not want to have the hassle and expense of filing for GST for no benefit. Your subscription does not include GST but, of course, you can claim the whole of it as a business expense/professional membership.

Class	Old	New
Member (journal and newsletter) (Australian and overseas)	\$60	\$75
Newsletter only		No change (still at \$25)
Local subscription (e.g libraries)		\$150 AUD
Overseas subscription		\$100 US
Reprints		No change

We will be asking you to include your e-mail address when we send out the new subscription notices.

### Newsletter

At the AGM it was officially accepted that the newsletter would become four each year. This has been the actual situation for the last couple of years (to my chagrin).

### Your Executive for 2001

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*Yes, I'm still in the job and I'll enjoy it if you  
keep those stories and photos coming in.*

*Ian Partridge*

*Presidential address continued...*

that all plants (including natives) will have weed status somewhere. The positive values of exotics are usually ignored.

On balance, our Queensland grazing industry has exercised more responsible stewardship of the grazing lands of the tropics than in southern states. We have more trees than the rest of Australia, and soil salinity and acidity are comparatively insignificant.

The north Australian graziers and farmers could be forgiven for believing that they are being asked to pay for the past sins (over-clearing, excess water use, salinity) of southern Australia where the serious and extensive land degradation problems in Australia currently exist.

### Leucaena as an example

Leucaena is a highly nutritious pasture legume tree planted over 60,000–80,000 ha in Queensland and sown in just about every tropical country in the world.

### Is it a weed?

Recent press has condemned leucaena as a major weed problem in some coastal areas of Queensland. This 'feral' leucaena has been in coastal northern Australia for some 100 years and is quite common around the ungrazed creeks, roadsides and other disturbed areas of coastal, urban Queensland.

There is no argument that it has become a problem in some areas. It can grow into thickets and reduce native plant diversity in areas where cattle do not have access and where soil disturbance is common (roadsides, creeks, etc). It is often stated that it is recognised as a weed in 20 or more countries. What is never stated is that its positive value as an animal (and human) protein source in these countries far outweighs any negative weed effects. It has done as much as any legume to provide animal protein in these countries. In Queensland, the anti-leucaena lobby blame its weed status on the grazing industry and are calling for restrictions (or ban) on its use by graziers. Not only are they conveniently ignoring its contribution to our rural livelihood, the question needs to be asked "Should the grazing industry be blamed at all?"

### There's leucaena and leucaena

In terms of area, I suggest that very little of the existing weed leucaena in coastal Queensland's urban areas can be blamed on the grazing industry. There is ample published information to support this. The following facts are on record.

- There are three sub-species of *Leucaena leucocephala*, two of which are in Australia. The sub-species *leucocephala* (called 'common' or 'Hawaiian' leucaena internationally) spread around the tropical world over the last three or four centuries. No one knows precisely how or when it reached Australia although all the early publications suggest it arrived in northern Australia over 100 years ago. This sub-species is widely recognised as invasive and has caused weed problems where not grazed in other countries. It is the 'weedy' one around the Pacific and almost certainly the weedy one in the urban areas of coastal northern Australia from Darwin to Brisbane.

- The Government Botanist of Queensland recognised leucaena as being 'naturalised' along coastal north Queensland at least as early as 1920, referring to naturalised stands on the Herbert River and at Bowen. It arrived in Australia at least 40 years before any commercial leucaena was released or promoted.
- **All** of our released commercial cultivars in Australia belong to the sub-species *glabrata*. Even before Mark Hutton and Stan Gray of CSIRO released the first cultivars for cultivation in 1962, they stated '*L. leucocephala* has been naturalised for many years in several areas of tropical and sub-tropical Australia. It occurs sporadically in Queensland at Brisbane, Gympie, Gayndah, Rockhampton, Mackay, Innisfail and at Darwin, NT.'

### How serious is the weed leucaena problem?

Certainly there are some long-established, slow-spreading, large patches of leucaena in urban, coastal areas of Queensland. However, to put the situation in perspective, leucaena has been in Australia just as long as prickly acacia (now covering 6–7M ha) and twice as long as parthenium weed (8–10M ha). Leucaena as a 'weed' infests less than 0.01% as much land as parthenium weed—the latter having no agricultural value at all.

Similar lopsided comparisons can be made with the other 'real' weeds like rubbervine (serious pest on 700,000 ha, sporadic over 35M ha) GRT, chinee apple and parkinsonia. Leucaena is frequently claimed to have the ability to cause similar problems to prickly acacia in the Mitchell grass area of inland Queensland; it has had as much chance and a similar time to do so. It has not done so nor is it ever likely to for a host of reasons, not least of all its lack of natural adaptation to the environment.

Unlike the serious weeds of pastoral areas, leucaena has a few things in its favour to reduce invasiveness:

- It is highly palatable and digestible to cattle at all stages of growth. It will be a potential weed only in areas without cattle.
- With leucaena, we now have the best suite of biological control agents of any unwanted plants. As well as native and exotic grazing animals, there are insects that effectively destroy the flowers, seed, growing tips and seedlings. Finding these controls has not cost the taxpayer a cent. Fortunately for the grazier, while these biological control agents restrict the capacity of leucaena to spread they have little effect on animal productivity.
- The urban weed leucaena problem can be controlled much more readily and cheaply than other more devastating weeds like rubbervine, chinee apple, lantana and cat's claw. Besides the insects that attack flowers and seeds to reduce its spread, there are very effective chemical control treatments.

*Presidential address continued...*

### Cultivated leucaena as a weed?

It could be, even though it has not done so to any significant degree yet. Its main 'weed' traits are that it can produce a large quantity of hard seed which can stay viable on the ground for many years, and that it is highly persistent once established. It can move (albeit slowly) outside the paddock via water/soil wash. Spread through animal dung is not common. It has the potential to thicken where animals do not have access if not grazed adequately. A few commercial plantings have thickened where cattle have been excluded for opportunistic seed crops. However, sown leucaena is subject to the same set of naturally occurring control agents as mentioned for the feral leucaena, in addition to cattle.

I find it hard to nominate any cultivated exotic tropical pasture plant (other than non-seeding ones like pangola grass) that has a lower potential to spread outside its sown area or is more easily controlled than the farmed *L. leucocephala* ssp *glabrata*.

The leucaena growers in Queensland have been astute and responsible enough to recognise that commercial leucaena could add to the existing 'common' leucaena weed problem on the coast. They have prepared and actively promote a voluntary Code of simple management strategies for its safe use. This Code aims to prevent the risk of leucaena spread from plantings by managing it to reduce ripe seed set, to keep it away from ungrazed areas and to control 'escapees'.

### Does it acidify the soil?

All legumes that 'fix' nitrogen (native or exotic) can acidify the soil. However in Queensland, almost all leucaena is grown, unfertilised, on base-rich, neutral to alkaline clay soils where acidification is not an issue, especially where a vigorous grass like buffel rapidly takes up the fixed nitrogen. Light-textured, infertile soils with potential for acidification are rarely suitable for leucaena.

### A question of plant diversity!

If I grew a crop of wheat, sugarcane, tomatoes, oranges, mangoes or grapes on cleared land, I would have few criticisms from conservationists about any reduction in native plant diversity.

However, if I grew leucaena or stylo or buffel grass for feeding cattle on that same land then the wrath of the conservation gods would descend on me. There seems to be this double standard that identifies grazing land (as opposed to cropping land) as unique and to be treated as 'national park'. National Parks (plus other protected lands) are the places to totally protect native plant diversity, not land dedicated to agriculture use and from which farmers have to make a living using sustainable production systems. Maintaining complete plant diversity on land assigned to farming will not feed the country nor pay the farmer's bills.

The important environmental issue on 'farming' land is that the condition of that farmed land (fertility maintenance, erosion control, salinity control etc.) is maintained, or even improved, for the next generation to manage.

### How good is leucaena?

Leucaena's production value is indisputable. There are no other rain-grown, tropical forage legume systems anywhere in the world to come close to those based on *L. leucocephala*. The reasons include:

**Its exceptional nutritive value**—equivalent to lucerne and twice that of other tropical pasture plants. This results from crude protein levels over 25%, high mineral content, extremely high palatability and digestibility, the by-pass protein mechanism resulting in more efficient protein use.

### Unsurpassed animal performance

Liveweight gains in growing/finishing cattle on leucaena/grass pasture easily reach 250-300 kg/animal/year (100 kg better than buffel grass pasture); production per unit area is at least double that from buffel grass and five times that from native pasture. It is the only pasture system that can consistently produce 2-4-tooth steers at 30 months of age and over 600 kg liveweight. This meets all the premium domestic and export markets. Steers on leucaena pasture can be turned off 8-12 months earlier than from buffel grass pasture. This has important benefits in terms of market flexibility and property management.

### Excellent agronomic characters

Leucaena is a truly perennial plant with a lifespan of more than 30 years, making it a cost-effective system (oldest grazed stand in Queensland is about 40 years). Its deep rooting confers drought tolerance and green feed almost throughout the year. Its tall growth habit confers tolerance to ground frost, and it tolerates fire.

### Environmental positives

The production value alone makes leucaena (ssp. *glabrata*) an exceptionally valuable plant. Moreover, no other pasture plant in tropical Australia (native or exotic) also offers such environmental sustainability.

*Returning the ecosystem.* Planting leucaena on cleared brigalow land—where most of it is grown—replaces one leguminous tree with another.

*Reversing 'run-down' of soil fertility.* Soil fertility declines over the years as available nitrogen is locked up in moribund plants. It has occurred where rhodes grass, green panic and buffel grass were planted in cleared and burnt scrub 50-100 years ago. The inclusion of leucaena stops this and quickly restores and even improves nitrogen fertility.

*Soil erosion.* A vigorous leucaena pasture grown with an accompanying grass is no less efficient at preventing soil erosion than pure grass. The water use to greater depth under leucaena results in less water run-off.

*Soil salinity.* Soil salinity in Queensland is negligible on the national scale. Even the worst estimate shows us with less than 1% of the estimated 5.7M ha affected nationally. However, recent press (National Land and Water Resources Audit) labelled the Fitzroy region of Queensland as 'most at risk' from future dryland salinity. If this is so and if the brigalow and Downs soils

*Presidential address continued...*

are implicated, we already have the ideal remedy in the deep-rooted leucaena. There is no chance of water tables rising to the surface under leucaena. It has a root system at least as extensive as the tree (brigalow) it replaces or the grasses and forbs it replaces on the largely treeless Downs. We have a remarkably environmentally friendly solution to the prevention of dryland salinity wherever grazed leucaena is adapted, and this fact should be promoted.

### Greenhouse gasses – carbon sink

The popular press lambasts the grazing industries for contributing to green house gasses (clearing and burning trees, methane emission from cattle). While close to 80% of greenhouse gas emanates from industry, mining, electricity generation, transport etc., land clearing by the Queensland grazing industry is always targeted as the most expedient way to reduce this problem.

But leucaena is a tree that acts as a carbon sink like any other tree, albeit on a smaller scale because it is grazed. This C sequestration

is positive (up to 0.5 t/ha/year or more). The added bonus is that a sustainable animal production livelihood by graziers is occurring while this process is going along.

I find it difficult to understand the double standards of ‘conservationists’ who condemn tree clearing on the one hand and then condemn tree planting (leucaena) on the other. This is even more baffling as almost all leucaena is being planted on land that was either initially treeless (downs country) or cleared 40–100 years ago under Government Development Schemes.

Not only should we be actively promoting the use of leucaena tree planting on a large scale on cleared grazing/cropping land to which it is adapted but we should also be prepared to claim ‘carbon credits’ for doing so.

*Lower methane.* Methane production from cattle eating high-quality leucaena pasture is significantly lower than that from native pasture of low nutritive value.

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## Newsletter on line

The new and more simple address of our Web site is given on page 2.

[www.tropicalgrasslands.asn.au](http://www.tropicalgrasslands.asn.au)

We have put the newsletter on the Web site as .pdf files in two forms for the last couple of issues. There is a small file without pictures and a larger file with the photographs included. At present, these are open to the world to view so some of you might be thinking that there is no need to pay your subscription.

In the coming year, we aim to make the newsletter available only through a password.

We are asking you to let us know your e-mail address when you return your subscription for 2001 and will be able to advise you of the password—which will be changed each year.

We also plan to cease mailing the newsletter directly to members on line, especially those overseas where postage is so expensive. Most on-line users have access to good printers and can print the pdf file.

We will advise members by e-mail when the new issue of the newsletter goes on line. This could be more than a month before the hard copies would be through the printers, distribution and postal service.

*Don't forget to put your e-mail address on the subscription form when you return it.*

# Pasture species – from Zimbabwe

Letter to Cam McDonald from Keith Keogh, our pasture champion in Zimbabwe

I read with interest your article in Tropical Grasslands March 2000 on legume performance at Narayen R. Stn. It rather mirrors results here from 1974 to 1994. Thought I'd pass them on to you, maybe they will be of interest.

Siratro has proved an adapted plant here, even under rotational summer grazing. Though it runs down badly under this management system, being too lax a plant. It is happier as a 'foggage' on areas reserved for fattening stock from late March onwards. Bulk is commensurate with total rainfall. Seed production potential is largely confined to late spring here and then only when stressed with a hot dry spell after good early rain—certainly not the norm here. Late summer seed crop is sparse, slow to ripen and usually partly ruined by aphid and tip wilting. It really does not fit our set-up as foggage is confined to black clay and our rather measly local glycine (*Neotonia wightii*) is more persistent, if a far inferior plant.

Fine stem stylo is only a goer here in really good seasons; it is a very high quality plant, too palatable for comfort. Fine stem seems to collapse over a hot dry summer. It overwinters here remarkably well—it's the summers that determine life or death. It is well suited to our rather frosty inland situation, but we are too hot and dry too often to have it persist.

Wynn cassia is a biennial here, in general. Enjoys hard grazing in early summer; persists better on areas of run-on water and combines well with thatch grass (*Hyparrhenia* spp.), undergrazing of course. It has not been too reliable as

it has to depend too much on annual seedling recruitment, and populations yo-yo very markedly. I have had to re-seed areas after a droughty season, and this is not good news.

Bargoo has never done well, we are too dry and our winters too long. The *Aeschynomene* spp. are not attractive at best, inoculation is necessary and seed production a nightmare. *A. braziliiana* has done better, but any species of *Aeschynomene* would have to perform excellently to warrant the big hassle of establishment.

We have had little joy with Seca either—probably too cold here and often the rains are over in four months, so very little seed. Fitzroy is a bit better, but not good enough. Anthracnose is rearley a problem here. We do have the local *Stylosanthes fruticosa* that succumbed to anthracnose so badly in Australia—it is hardly an inspiring plant.

We have gone over to Caatinga stylo (cv. Primar) on the grazed black soils and to *S. mexicana* (CPI 87479) and *Desmanthus virgatus* on the contact clay loams. Time will tell how persistent they will be and of course they all have to be inoculated. This year, we've tried *S. hippocampoides* ATF 3067, 70, 71, 76, 77 and a type of fine stem from very much drier area. it is fully decumbent like a ground cover. Also tried *S. scabra* CPI 93099 which seems most promising despite the good season. All these plants appear better adapted to this area.

Just a comment, surely there could be no worse companion grass in a poor rainy year than buffel—as bad maybe, like our *Eragrostis rigidica*?

Comparison of Narayen, S.E. Queensland and Edwaleni, Zimbabwe

	Summer rain (mm)	Winter rain (mm)	Altitude m	Latitude S	Frost	<i>Heteropogon</i>	Soil Ca Mg K
Narayen	500	200		27	Y	Y	
Edwaleni	500	30	1100	19	Y	Y	High

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## Tenders for Journal Editor

The job of Journal Editor is coming up for tender as Lyle Winks' 3-year contract expires.

The position is a major undertaking, the Journal being the most prestigious and visual part of the Society in Australia and overseas.

The work entails:

Complete editing of the Journal, *Tropical Grasslands*, to produce 4 issues each year.

This includes:

1. acknowledging receipt of manuscripts
2. arranging refereeing of manuscripts either directly or via the panel of Associate editors
3. maintaining a register of submitted manuscripts and their stage in refereeing
4. monitoring progress in refereeing manuscripts by liaising with Associate Editors
5. notifying senior authors of acceptance or rejection of manuscripts
6. selecting material for inclusion in various issues
7. arranging for completion of reviews on relevant books

8. completing final editing of all manuscripts to conform to Journal style
9. negotiating with typesetters and printers and TGS Business Manager
10. forwarding galley/page proofs to senior authors for checking and incorporating appropriate corrections negotiating with Executive of TGS regarding publication of Special Issues of the Journal
11. notifying Business Manager of orders for reprints from authors
12. providing newsletter Editor with a list of articles to be published in the next issue as Practical Abstracts
13. attending Executive meetings of the Society and reporting on activities
14. presenting an annual report on activities to the Annual General Meeting of the Society, with any recommendations for change.

If you would like to become the Journal editor, please submit your tender in confidence by 11th February 2001 to the Secretary TGS, c/- CSIRO, PO Box 102, Toowoomba 4350 in a sealed envelope marked 'Confidential- Tender for Journal Editor'.

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## What's in a (buzz) word?

CSIRO has changed its focus and direction over the years, as reflected by its changes in name. *Tropical Pastures* went to *Tropical Crops and Pastures* to *Tropical Agriculture* and now *Sustainable Ecosystems*.

DPI has been through its structural changes too. From Branches to Regions to Institutes, and now under an all-enveloping Agency for Food and Fibre Sciences (AFFS). The current focus of AFFS is on research and adding value to the food and fibre chains—with 'zero-footprint' technology and adhering to a 'triple bottom line'—economic, social and environmental.

The new DPI will help 'participants in food and fibre chains focus on consumer demand for convenience, safety and sensory appeal as well as meeting community demand for ethically produced retail products. New service directions include:

- Recycling organics – returning to the land all that has been removed and return it in such a way as to repair centuries of leaching across our most fragile of resources, such as in Cape York, desert uplands and rangelands
- Managing extensive and intensive production lands, using 'zero footprint' principles and technologies.\*

Phew!—big job to repair those centuries of leaching on the Peninsula.

\*from the Department of Primary Industries Corporate Plan for 2000–2005

# TGS Executive Committee Report – 2000

This Executive Committee Report is presented to members as a summary of the main activities undertaken during the year.

Executive members participated in six meetings over the year, two of which were TeleConference hook-ups to reduce travel costs. Member attendance at Executive meetings was excellent considering their wide distribution in Queensland.

We lost our Secretary (David Eagles) mid-year when he went to Tasmania. Dr Anthony Whitbread was appointed to fill the vacancy and has done a very good job. Our Office Manager Kathy Mitchell ably filled the Secretary's shoes when he was away on work commitments. We thank Kathy for keeping the Society's Office business in order.

## Membership

Total membership (575) consists of 187 Subscription Members, 18 Honorary members, 79 Agent Members, 226 Journal Members and 75 Newsletter Members. Overall membership is stable although subscriptions declined (refer to Treasurer's Report).

## Money Matters

The Society has completed the 1999-2000 financial year in an improved financial position with total net assets (less liabilities) of \$109,000. This represents an increase in net asset value of \$14,000 compared with the previous financial year (\$95,000), and is due primarily to the TGS Conference. Cash reserves increased in line with the profit generated through the TGS Conference to approximately \$86,000.

Membership and subscriptions have been relatively stable, with increasing interest from overseas scientists. However, expenses are in excess of revenue by \$3,000 - \$5,000 (omitting Conference profits), and this shortfall needs to be addressed.

## Emerald Conference

Feedback indicated the Tropical Grassland Society Conference "*Pastures for Production and Protection*" held at Emerald Agricultural College on 26-28 April 2000 was very successful.

About 140 people attended the conference.

Most people attending came from Queensland, with representatives from other states (including WA, NT and NSW) and from overseas (including South Africa, Philippines, Brazil). The number of producers present was not high despite wide publicity.

The formal presentations were varied and highlighted the point that highly productive systems can also be sustainable. Presentations ranged from grazing management to the biology and control of weeds to mine revegetation.

The good news was that a profit of \$16 000 was made.

On behalf of the Society, the Executive Committee again wishes to thank our major sponsors of the Conference.

They were CSIRO Agriculture, GRDC, Heritage Seeds and DPI.

## Field Days

Gympie Nov '99 – After the AGM last year, about 50 people travelled to three R&D sites near Gympie to see a range of 'new' pasture grasses and legumes being tested commercially.

"Lindley Downs" Orion (Stuart Coaker) and "Indiri" Rolleston were visited in April 2000 as part of the Emerald Conference and Workshop. The purpose was to see how graziers were incorporating legumes (butterfly pea and leucaena) into farming and grazing enterprises.

"Coorabelle" Springsure (Paul Martin) was also visited as part of the Emerald conference program. Attendees were given a first hand look at a newly established cell grazing operation.

Capella-Clermont area visit to several woody weed control (biological and chemical) sites

Heritage Seeds whose support is acknowledged sponsored the last three field visits.

## MLA/TGS Pasture Award

At a field day in April 2000, the MLA/TGS Award was presented to Mr Stuart Coaker of "Lindley Downs", Orion. The Award recognised Mr Coaker's pioneering work in popularising the 'clay soil' legume butterfly pea. Its multi-use and integration into his farming system was highly innovative.

## Journal

The Journal had another successful year with three issues published since the last AGM. These contained 22 articles and 3 book reviews. The September and December 2000 issues will be combined and will contain the proceedings of the Tropical Pastures Conference held in Emerald in April. Once again Australian content is below the desired level with only 8 of the 22 papers published in the last three issues originating in Australia. At least the Conference Proceedings will be almost totally local content. The current contract for Journal Editor expires with the publication of the December issue, so we have called for expressions of interest in performing this role for the next 3 years.

## Newsletter

The highly successful Newsletter was again very capably produced by our Editor, Ian Partridge. Four newsletters (350 print run) in 2-colour format and containing many photographs, have been distributed over the last 12 months.

170 copies of the working papers for the Pasture Conference in May were produced. Edited versions of papers will be published in Tropical Grasslands.

We printed 500 new membership application forms for the Conference.

We are now also putting a pdf edition of the newsletter on the Internet on the TGS Web page, to speed up transmission to overseas members and maybe to save postage.

A new 'Pasture Picker' database has been designed for the pasture Web book "Better Pastures For The Tropics And Subtropics" to allow more efficient access to data relevant to clients' needs.

Other issues relating to the newsletter ( Editor position, Newsletter on Internet etc) will be discussed in the business section of the A GM.

### Fellowships

At the April conference at Emerald, three highly valued members were inducted into the Society as Fellows. Their citations were read at the Conference dinner and will be published in the Journal. The Management Committee, on behalf of Members, is proud to accept them as Fellows of the Society. They were:

John Rains – for services to seed production, seed production technology and the active promotion of

tropical pasture use in Australia and overseas.

Dick Date – for Queensland and international R&D achievement in legume rhizobium and nodulation technology.

Harry Bishop – for the evaluation, development and promotion of tropical grasses and legumes especially in wet tropical environments.

Fellowship nominations for 2000 will be presented at this A GM.

### Acknowledgments

On behalf of members, the Executive Committee would like to thank CSIRO (Long Pocket Laboratory) for allowing the Society to use their meeting and mail facilities.

The Management Committee wishes to thank all members and Subscribers for a successful year and wishes the new Executive success in 2001.

Col Middleton, President

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## TGS Fellow – Bill Burrows

Bill Burrows has spent most of his working life researching the ecology and management of grazed woodlands, firstly in the mulga lands, lately in eucalypt woodlands.

He and his colleagues can be credited with the foresight to persist with the first long-term woodland monitoring sites in Queensland that Joe Ebersohn devised. These have been in existence for 35 years. This initial pioneering work has led to some further 150 permanent woodland monitoring sites in Queensland, and has provided the scientific backbone to the management of woody vegetation in Queensland's rangelands.

In 1980, Bill transferred to Rockhampton to work in speargrass country. He was leader of the team that produced and promoted sustainable woodland clearing and management guidelines (based on scientific results and principles) over a decade before legislative controls (non-science based) were imposed on graziers.

In 1987, Bill and his team commenced long-term grazing studies of black speargrass pasture to determine the interaction between pasture, soil and animal and define sustainable management practices. In recent years, he has been heavily involved in national and international carbon accounting having accumulated a mass of data from monitoring sites throughout the woodlands of Queensland.

Bill has little time for those who chose to make important land use decisions based on politics and emotion, one of his favourite sayings being "*politicians come and go but good science will live forever*".

During his career, Bill has published over 90 scientific papers, and has also been a great communicator with rural industry.

He has received many well-earned Honours and Awards during his career including: Honorary Senior Fellow, School of Applied Science, Central Queensland University 1992; Fellow, Australian Institute of Agricultural Science 1993; Cattleman's Union of Australia Research Medal, 1996; Fellow, Australian Academy of Technological Sciences and Engineering, 1999.

He has been active in Scientific Organisations including the Australian Rangeland Society (Editor 1977-78, Vice President 1977-79 and president 1978-79) and the Australian Institute of Agricultural Science (CQ Sub-branch Treasurer, 1991-92).

Bill has been an active Member of the Tropical Grassland Society of Australia since 1964 and served as Vice President in 1991-92 and President in 1992-93 when he was heavily involved in organising the International Grassland Congress co-hosted in Rockhampton.

Bill's significant impact on the understanding, development and management of Queensland's grazed woodlands makes him a worthy recipient of this Award.

# The Pasture Picker

## Which species for you?

Many of you know that information about pasture grasses and legumes is available on the Internet through the Department of Primary Industries Web site. This information is basically that taken from the book *Better Pastures for the Tropics and Subtropics* by Ross Humphreys and Ian Partridge.

The system of accessing information was through a series of reducing menus—was it a grass or legume, tropics or subtropics, high, medium or low rainfall, clay, loam or sand soil type? This was clumsy, but I didn't know enough about data bases, and a few years ago the DPI was not keen on databases being interactive on their site.

Now we have developed the Pasture Picker, which lets you enter the characteristics that you

The screen of species shows their characteristics visually. Click on any species and the Picker goes off to find the info sheet about it (3).

This sort of expert system relies on the subjective experiences of pasture researchers and specialists (tap their years of experience while they are still around). They included Dick Jones, Cam McDonald, Bruce Cook, Col Middleton, David Illing, Ben Mullen and myself, while Greg Pinington of DPI designed the Pasture Picker itself and the database. The Pasture Picker should be up and working early in the new year.

Give it a try at

[www2.dpi.qld.gov.au/pastures/welcome.html](http://www2.dpi.qld.gov.au/pastures/welcome.html)

Note the www2 while the DPI is in the process of transferring the pages of the old Web system to their new design on [www.dpi.qld.gov.au](http://www.dpi.qld.gov.au)...

Check the new DPI Web site

Check this newly designed DPI Web site at [www.dpi.qld.gov.au/](http://www.dpi.qld.gov.au/)

It contains a new search engine for subjects (such as pastures) and for key words. The new approach is to provide users with information on subjects rather than on boring government institutions.

It's good.

1

**Pasture Picker**

Pasture:  Grasses  Legumes

Region:  Tropics  Subtropics

Rainfall (average annual):  Low (<600 mm)  Medium (600-1000 mm)  High (>1000 mm)

Soil type:  Pandell  Clay  Loam  Sand

Tolerance to:

Frost:  Any  Good  Very good

Drought:  Any  Good  Very good

Waterlogging:  Any  Good  Very good

Heavy grazing:  Any  Good  Very good

2

**Pasture Picker**

Legumes for the subtropics with high rainfall on Sand soil.

Min. tolerance: Frost =  P  Drought =  P  Heavy grazing =  VG

Pasture species	Tolerance to:				Clay	Loam	Sand
	Frost	Drought	Waterlogging	Heavy grazing			
Cowley vetch ( <i>Vicia cracca</i> )	VG	P	F	VG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Jackbean vetch ( <i>Aeschynomene sacata</i> )	F	G	P	VG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Parrot's foot ( <i>Aeschynomene vicia</i> )	P	P	G	VG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Lotus ( <i>Lotononis bainesii</i> )	G	P	P	VG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Downy vetch ( <i>Avicenne graveola</i> )	F	P	P	VG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pinto peanut ( <i>Arachis pinto</i> )	F	P	P	VG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Java Pine Bean ( <i>Stylosanthes pappocarpoides</i> )	F	P	P	VG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vigna (Bisera) ( <i>Vigna parviflora</i> )	P	P	P	VG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

P  -poor, F  -fair, G  -good, VG  -very good

are looking for—all of the above plus 'Tolerances to frost, waterlogging, drought or heavy grazing' (1).

Hit the Find button and the Pasture Picker lists the suitable species (2), (though if you are too fussy with all the criteria it may say 'No species' suitable).

3

### Better Pastures for the Tropics and Subtropics

#### Pinto peanut (*Arachis pinto*)



- non-forming perennial
- best in moist, well-drained moderately fertile soils
- planted from seed or cuttings
- highly specific rhizobium
- very productive under heavy grazing

Creep., non. mult.  
1. habit flowering plant,  
2. fruits.

Creeping forage peanuts are comparatively new, but show great promise for well-grazed legume pastures in the tropics and subtropics. They grow best in moist, well-drained and moderately fertile soils to produce high-quality feed over a long growing season.

The plants have a strong tap-root, but are also strongly rhizomatous along the more prostrate stems. They can spread underground even under heavy grazing, sending up sprouts some distance from the base plant in mable soils, and form dense mats up to 20 cm deep.

Although best suited to rainfall above 1100 mm, creeping peanuts can survive dry seasons of 4 months or more.

# New tropical legumes for mixed farming

Anthony Whitbread and Bruce Pengelly, CSIRO Toowoomba and Brisbane

Grain yields on the Downs of southern and central Queensland have been declining after decades of continuous cropping. Farmers try to keep yields up with nitrogen fertiliser but other problems arise with soil structure and disease.

Good farming needs a rotational system alternating crops and pastures. Grasses are best at restoring soil structure; legumes are best for restoring nutrient fertility. But which legumes and how can they be made economically productive? Winter-growing legumes are well suited to the clay soils where winter rainfall is adequate but there has been a paucity of summer-growing species, except for the old annuals of cowpeas and lablab. Farmers want something that will last for more than one year if it is to be effective and profitable.

CSIRO has developed a new perennial lablab (*Lablab purpureus*) after a seven-year breeding program and has tested it in conjunction with the DPI and local farmers. This perennial lablab, called cv. Endurance, was released in 1998; the first seed was available to industry in late 1999.

A wide range of tropical legumes has been tested on the western Darling Downs, and in northern NSW and central Queensland. After on-farm evaluations under grazing, Burgundy Bean (*Macroptilium bracteatum*) was approved for release in 2000 on the basis of its persistence, animal digestibility, seed production, seedling recruitment and potential for building up soil fertility. Seed of Burgundy Bean should be available to industry in late 2001.

Milgarra butterfly pea (*Clitoria ternatea*) was released in 1991 for use in ley pastures on the heavy-textured soils in northern Australia. Experience suggests that Milgarra is more suited to the Central Highlands and the more northern areas than to the southern downs.

The three perennial legumes were compared in an on-farm trial on a deep, cracking clay brigalow soil at Downfall Creek, near Wondoan in the summer of 1998/99. Yields were measured before cattle grazed the legumes in April 1999, December 1999 and February 2000.

Endurance gave the best yields in the first year and continued to out-yield Milgarra in the second year. Burgundy Bean was as good as Endurance in the summer of 1999-2000.

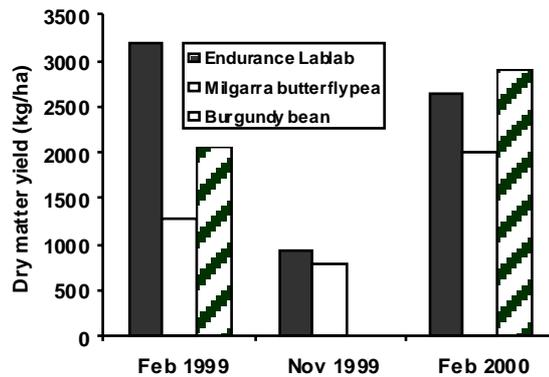


Figure 1. Yields of Endurance lablab, Milgarra butterfly pea and burgundy bean before each grazing.

However, Endurance lablab dropped no seed that year, whereas high seed production by Milgarra butterfly pea and burgundy bean would ensure that more plants would establish when conditions became right.

Table 1. Seed drop and survival over winter

Species	January 1999		September 1999
	Plants/sq.m	% persisted	Seeds/sq.m
Endurance lablab	6.0	90	0
Milgarra butterfly pea	6.5	98	260
Burgundy bean	11.3	33	823

All three of these species are well suited to the Western Downs areas and have the potential to provide high quality forage and produce large quantities of N to improve soil fertility.



Distinctive leaf shape of burgundy bean, with siratro-like flowers

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