Tropical Grassland Society of Australia Inc.

# TGS news & views

about pasture development in the tropics and subtropics

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# Buffel — wicked weed or good deed?

**John McIvor, CSIRO Sustainable Ecosystems, Brisbane**

Buffel grass (*Cenchrus ciliaris*) invokes diverse opinions in Australia.

## Good grass?

Agriculturalists recognise buffel as the most valuable introduced grass in arid and semi-arid tropical areas where it has been widely sown for pasture and soil conservation. It was usually sown on a cultivated seedbed or into country that had been cleared and burnt and where most of the existing ground layer destroyed.

Establishment success varied but many good buffel grass pastures have established and persisted. However, spread from these established pastures has often been slow or non-existent, and some producers consider buffel would be even more valuable if it was able to colonise unsown areas more rapidly.

## Wicked weed?

Environmentalists consider buffel grass to be one of Australia's worst weeds. It is invading along riverbanks into mesic habitats in the arid zone, forming dense mono-specific stands, it is changing fire regimes, threatening key fauna refuges and displacing native plants. It is an aggressive coloniser of moist habitats such as run-on areas, river levees and alluvial pans.

## Natural spread poor

In his *Buffel* book, Jim Cavaye has said 'Natural spread [of buffel] occurs only on fertile lands where the residual vegetation is removed one way or another. Its spread into good native pastures is poor.' We know that buffel needs medium to high levels of phosphorus and that some soil

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*The good grass. Buffel grass and green panic sown in the brigalow lands produce much of our best beef.*

Newsletter editor:
Ian Partridge
Tel: (07) 4688 1375
Fax:(07) 4688 1477
ian.partridge@dpi.qld.gov.au

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# Society News

## Our Internet address — www.tropicalgrasslands.asn.au

Our Society e-mail address is tgs@csiro.au

## 40th Annual General Meeting

The 40th Annual General Meeting was held on Thursday, 4th December 2003 at the Department of Primary Industries Complex at 203 Tor Street, Toowoomba.

The normal minutes and reports were presented and can be forwarded to any member who would like to view them.

The Treasurer's report is given here becasuse it has important implications to the financial viability of the Society.

### TGS Treasurer's Report 2003

Financially, Tropical Grasslands has experienced a disappointing year with an operating loss of $14,000. This is the largely the result of significant reductions in memberships and subscriptions to libraries and organisations(Table 1), and the appreciating Australian dollar. Subscriptions are charged at US$100 to international clients and AU$150 to Australian clients. Journal memberships are charged at AU$75 for all members. We have lost over $2,000 in revenue from reductions in subscriptions and approximately AU$1,000 from reductions in memberships. The exchange rate has eroded a further $5000 from overseas income. Auditing practices have also added to our recorded losses, as our reducing stock of books is now recorded as an expense (about $3,000 for 2003). In addition, our costs have increased by approximately AU$7,500 over the past year.

TGS finances are normally volatile from year to year due to the impact of significant publications and the 5-yearly conference among other things (Table 2). However once again, strategic planning will be required to ensure the Society's long-term survival.

# Your Executive for 2004

### President

Dr Max Shelton
School of Land & Food Science
University of Qld, St Lucia Qld 4072
Phone: 07 3365 3474; Fax: 07 3365 1188
e-mail: m.shelton@mailbox.uq.edu.au

### Vice President

Peter Larsen
'Cedars Park'
Banana, Qld 4702
Phone and fax: 07 4995 7228

### Past President

David Orr
DPI
PO Box 6014, Rockhampton Mail Centre, Qld 4702
Phone: 07 49360238 Fax: 07 4923 8222
e-mail: David.Orr@dpi.qld.gov.au

### Secretary

Cristine Hall (nee Cox)
CSIRO Sustainable Ecosystems
PO Box 102, Toowoomba Qld 4350
Phone: 07 4688 1569
e-mail: Cristine.Hall@csiro.au

### Treasurer

Mark Callow
DPI Mutdapilly Research Station
MS 825, Peak Crossing
Ipswich, Qld 4306
Phone: 07 5464 8714
Fax: 07 5467 2124
e-mail: Mark.Callow@dpi.qld.gov.au

### Journal Editor

Lyle Winks
McNeills Rd
MS 825, Ipswich, Qld 4306
Phone: 07 5467 2314
Fax: 07 5467 2314
e-mail: lwinks@gil.com.au

### Newsletter Editor

Ian Partridge
QDPI, PO Box 102
Toowoomba Qld 4350
Phone: 07 4688 1375
Fax: 07 4688 1199
e-mail: Ian.Partridge@dpi.qld.gov.au

| | | |
|---|---|---|
| **Total Cash on Hand** | **$73,526.78** | **$84,668.82** |
| | | |
| **Total Current Assets** | **$73,526.78** | **$84,668.82** |
| | | |
| **Other Assets** | | |
| Books Stock | $11,789.00 | $14,845.00 |
| Journals Stock | $2,000.00 | $2,000.00 |
| **Total Other Assets** | **$13,789.00** | **$16,845.00** |
| | | |
| **Property and Equipment** | | |
| Computer System | $0.00 | $0.00 |
| PA System | $0.00 | $0.00 |
| Banner | $0.00 | $0.00 |
| Portable Book Stall | $0.00 | $0.00 |
| **Total Property and Equipment** | **$0.00** | **$0.00** |
| | | |
| **Toal Assets** | **$87,315.78** | **$101,513.82** |
| | | |
| **Liabilities** | | |
| **Current Liabilities** | | |
| Forward Subscriptions | $300.00 | $375.00 |
| | | |
| **Total Current Liabilities** | **$300.00** | **$375.00** |
| | | |
| **Total Liabilities** | **$300.00** | **$375.00** |
| | | |
| **NET ASSETS** | **$87,015.78** | **$101,138.82** |
| | | |
| **EQUITY:-** | | |
| Retained earnings c/f | $101,138.82 | $98,065.91 |
| Current Year Profit(Loss) | ($14,123.04) | $3,072.91 |
| | | |
| **Total Equity** | **$87,015.78** | **$101,138.82** |

Table 1. Fluctuations in TGS newsletter members (N/L), journal members and subscribers (Subs) from Australia and overseas (O/s) over the past 5 years.

| Year | 1994 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|
| N/L Aust | | | 67 | 65 | 107 | 95 | 75 |
| N/L O/s | | | 5 | 4 | 5 | 6 | 4 |
| Total N/L | 100 | 69 | 72 | 69 | 112 | 101 | 79 |
| Journal Aust | | | 111 | 120 | 128 | 124 | 123 |
| Journal O/s | | | 62 | 61 | 62 | 54 | 42 |
| Total Journal | 318 | 194 | 173 | 181 | 190 | 178 | 165 |
| Subs Aust | | | 36 | 36 | 38 | 37 | 40 |
| Subs O/s | | | 107 | 106 | 92 | 90 | 73 |
| Total Subs | 234 | 187 | 143 | 142 | 130 | 127 | 113 |
| Agents | 74 | 74 | | | | | |
| Total all categories | 726 | 524 | 388 | 392 | 432 | 406 | 357 |

*continued on page 4...*

*Society News continued from page 3.*

| Year | Profit (Loss) | Comments |
|---|---|---|
| 1997 | ($30,050) | Liability of $11,000 inherited from previous year. Two additional volumes published |
| 1998 | ($1,640) | Scholarships cancelled to stem losses |
| 1999 | ($3,900) | Fees increased |
| 2000 | $16,083 | Conference at Emerald yielded profit of $12,000 |
| 2001 | ($7,720) | Some costs from conference were paid in 2001 |
| 2002 | $3,070 | Fees increased and subscriptions charged in US dollars |
| 2003 | ($14,120) | Strengthening Aussie dollar, member/subscriber losses, increased costs |

## Tenders for Journal Editor

Tenders for the position of Journal Editor are being called 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 each issue
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
11. proof reading the galley/page proofs of all articles before publication
12. checking dyelines of each issue of Journal prior to printing
13. negotiating with Executive of TGS regarding publication of Special Issues of the Journal
14. notifying Business Manager of orders for reprints from authors
15. providing Newsletter Editor with titles of articles to be published in the next issue along with Practical Abstracts
16. attending Executive meetings of the Society and reporting on activities
17. 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 31st March 2004 to the Secretary Tropical Grassland Society, c/- CSIRO, PO Box 102, Toowoomba 4350 in a sealed envelope marked 'Confidential– Tender for Journal Editor'.

*Continued from page 1.*

*The bad environmental weed? Buffel grass colonising riperian land in the Cloncurry region on a soil with high P.*

disturbance is needed for good establishment. This suggests that soil fertility and competition from other plants are factors affecting spread by buffel grass.

## Weak seedling

We have seen that buffel spread from initial establishment at several sites in north Queensland was poorer than that for other introduced grasses such as Sabi grass (*Urochloa mosambicensis*), creeping blue grass (*Bothriochloa inscultpa*) and Rhodes (*Chloris gayana*). In trials around Charters Towers, buffel spread into surrounding native pasture was poor in good years but faster when these native pastures were severely weakened by a long drought and subsequent overgrazing.

## Strong plant

Our trials have shown that buffel grass is strongly competitive as an established plant, but only weakly competitive as a seedling. It can establish where there is little competition and colonise bare areas but it cannot invade established native pastures.

## Coloniser or an invader?

A coloniser has been defined ecologically as a plant that can spread rapidly on bare areas where these are large enough for the plant to establish and complete its life cycle. Invaders can enter and multiply in vegetation without large gaps and can complete their life cycles under severe competition. Under this definition, buffel is a coloniser and not an invader.

So why is buffel invading those riparian areas in the arid zone. In the arid areas, grazing paddocks are large and cover a range of country. The more fertile and better-watered areas along the water courses are grazed preferentially by both introduced and native animals leading in some areas to overgrazing. Even with little or no grazing, bare areas are often created by droughts, providing the open space that buffel needs to colonise. So despite its alleged ecological nastiness, buffel could be claimed to have protected the soil against erosion from wind or the flooding that often occurs after a drought. And buffel might well be a more preferable option than many other species. As long as these regions are grazed, it is almost impossible economically to prevent stock from seeking water and the sweeter country.

# Range science ain't rocket science

Discussions about management of our native pastures is an ongoing topic for producers and pasture ecologists. What are the right stocking rates to best manage our resources? How accurate can we be with all the spatial variability of large rangeland paddocks and the temporal variability of a horribly variable climate.

Man can land a vehicle on Mars after it has travelled for 9 months and it can send back colour images in 3-D while we can't tell producers how many cows to run in a paddock.

By saying that range science isn't rocket science, some infer that range science is a relatively simple practice.

But I prefer to interpret the saying in a different manner:

I don't think range science is simple relative to rocket science at all — in fact I think rocket science is the simple part. It is, after all, based on classical Newtonian physics, where things operate in a strictly predictable, deterministic manner, constants are known to the 10th decimal place and uncertainty is very very low. For example, any astronomer worth his salt could predict the exact location of the moon on any date in 2000 years time.

In contrast, we in range science are working with extremely complex, often chaotic, systems — our knowledge of how things operate is superficial and our constants or variables are usually guesses or estimates.

Add to that extreme spatial and temporal variability, human interference and two or three herbivores and you have complex, interacting systems with multiple feedback loops that are very very difficult to understand or model. I don't believe anyone could predict the pasture yield or species composition of a site to within 500 kg in five years time, let alone 2000!

Let's not fool ourselves that we know things to the nth degree and try and calculate things down to 10 decimal places.

For most of these things, we are just grasping at some process that is only poorly quantified so we should be content with broad, even ballpark, figures. If we do not, we are simply deluding ourselves.

I, for one, have often tried to work out end-of-wet forage budgets and then fiddled with factors such as wastage until I got an answer that 'felt' about right!

Of course, this is quite acceptable (modelers do it all the time !) when one simply has no real data such as percentage wastage to plug into a formula.

This is no excuse for walking away from the problem—we have to try and hone things like wastage, detachment, down to the nth level but, when we crank the answers out, we must not forget the sampling errors and guesswork associated with everything going into the formula.

So remember, rocket science is easy – it's the likes of ourselves that are pushing back the frontiers of science! It's just that Mars shots and astronauts are a lot more sexy than grasses.

**Peter O'Reagain**
**DPI, Charters Towers**

Editor's note: The Proceedings of the 2003 Annual Conference of the joint Grassland Society of Victoria and the Grassland Society of New South Wales were titled—-

*Grassland Farming – Rocket Science*

with papers describing the use of satellite imagery for monitoring pastures and landscapes. So the southern states do consider their pasture science to be rocket science!

*Just some of the interactions in the natural grazing ecosystem — rain x grass x trees x cattle x legumes x fire*

# Ground cover in southern China orchards

**Wen Shilin, Chinese Academy of Agricultural Science, Hunan Province, China**

Fruit trees, primarily citrus, are an important form of land use in southern China. These orchards are planted on hillsides of infertile red soils and kept weed-free. Erosion can be severe.

## Cold winters, hot summers

In Hunan Province (27°N), summers are hot with maximum temperatures of 34°C in July while winters are cold with 9° max and 4° min in January and usually one or two light snowfalls. Rainfall averages 1300 mm, with late spring/early summer wet and late autumn/winter dry.

## Legumes for ground cover

The most successful legume has been **lotononis** (*Lotononis bainesii* cv. Miles) because its ability to grow in the cool season is well suited to the spring-dominant rainfall pattern. This species is easily established from rooted stems when we apply 30 kg P/ha. Lotononis provides excellent ground cover throughout the year and its taproots persist over winter. When spring arrives, the legume grows rapidly and can be cut to provide early forage for cattle. Lotononis has remained vigorous probably helped by our hand-weeding of unwanted grasses.

**Wynn cassia** (*Chamaecrista rotundifolia* cv. Wynn) is less successful as the taproots die over winter. Seedling growth is slow until late spring so there is only dead plant material to protect soil during the heavy rainfall in spring. Wynn cassia's vigorous growth during the warmer months make it more competitive for soil moisture at a time when rainfall can be limiting. Also, the demand for forage during summer is lower because grasses such as elephant grass (*Pennisetum purpureum*) are actively growing. Freshly cut Wynn cassia is also much less palatable than lotononis.

**Amarillo peanut** (*Arachis pintoi* cv. Amarillo) has also persisted, surviving the very cold 2003 winter when temperatures dropped to –7°C and 400 mm of snow fell. A small plot of an *Arachis pintoi* x *A. repens* hybrid also survived the 2003 winter and will be planted out over a larger area.

***Lotononis providing ground cover between rows of mandarin trees***

# Pasture planning in Paraquay

**Albrecht Glatzle, INTTAS, Filadelfia, Paraguay**

The Gran Chaco is a vast alluvial plain (800.000 $km^2$) with erosion sediments from the Andes. This unique semi-arid to sub-humid region with summer rainfall stretches from about 16° to 25°S, and is shared between Argentina (50%), Paraguay (30%) and Bolivia (20%). The native vegetation is a drought-deciduous shrubland in the drier parts while the wetter parts are dominated by seasonally water-logged native grasslands and palm tree savannas (*Copernicia alba*).

## Land resource planning

South American governments are often blamed for allowing unrestricted clearing of forested land for pasture development.

Since the 1960s, fairly intensive grazing systems have been developed in the Paraguayan Chaco on land previously cleared and sown to Gatton panic, buffel grass and other adapted grasses. But about 80% of the Chaco is still almost undisturbed.

There is strong and increasing pressure from the Paraguayan Government to respect a number of land use restrictions. Cattle farmers are no longer allowed to clear bush indiscriminately. Before clearing they have to present an approved land-use plan that comprises an inventory of the natural resources (vegetation, soil and water) and how to use them.

A minimum of 25% of the area of a farm has to remain untouched—preferably in one single coherent block. A bush corridor of 100 m width has to be left every 500 m of cleared pastureland and in an east-west-direction as the prevailing winds come from north and south.

No coherent piece of land bigger than 100 ha can be cleared unless it remains surrounded by a 100 m wide strip of bush. And adequate bush strips also have to be left around any kind of water source such as water camps, seasonal courses, lagoons, even if temporary, and areas prone to dryland salinity.

Thus overall, a maximum of 60% of a farm can be developed into grazing or cropping land, and in practise this is often less than 50%. In spite of ongoing corruption producing exemptions, the land use restrictions (surveyed on the ground and by satellite imaging) generally guarantee the creation of a diverse agro-ecosystem and an amenity park-like landscape.

*Fields of Gatton panic have been planted in the Chaco over the past decades.*

*Land clearing guide lines for the Chaco aim to protect the resource while providing for new pasture development.*

I work for (INTTAS = Iniciativa para la Investigación y Transferencia de Tecnología Agraria Sostenible) so far predominantly financed by the AVINA foundation of Swiss origin. One of the objectives of INTTAS is to diversify pastureland cleared before the land use restrictions were implemented. This includes working together with farmers and local extension services on:

- diversification of available grass species
- integration of herbaceous legumes in pastures
- establishment and utilisation of leucaena
- the establishment of silvopastoral systems by the volunteer but guided regeneration of Algarrobo trees (*Prosopis alba* and *P. nigra*) in pastures.

## More grasses

Buffel grass was introduced from Texas into the Paraguayan Chaco in the 1950s. For some 30 years it was the only grass sown on any significant scale until buffel blight and other foliar diseases came in; it also showed limited persistence on sandy soils and intolerance to even short-term waterlogging. In recent years, the new Australian buffel cultivar 'Viva', which has so far has been totally resistant to the blight has been spreading slowly in the dry Chaco.

Buffel grass has been largely replaced by Gatton panic since the late 1980s. Gatton panic was introduced into the Chaco some 20 years after its release in Australia. Nowadays it is widely sown because it is easy to establish and seed is easy to harvest. It is also a strong reseeder, quickly thickening up poor stands.

In the 1990s, the Estación Experimental Chaco Central (a German Aid Project) and, since 2001, the INTTAS project have contributed greatly to the diversification of pasture grasses: *Urochloa mosambicensis* is now an ever more appreciated grass as it is a strong colonizer even in old pastures. Callide Rhodes is progressively spreading on heavy soils in the subhumid areas of the Chaco as is Bambatsi Makarikari grass. *Dichanthium caricosum* is another species slowly being adopted for clay soils.

More than 100 accessions of *Digitaria eriantha* and related species are being tested under real grazing conditions at farm level. We hope eventually to be able to produce a seed mix of elite lines with superior persistence.

## Legumes

Numerous herbaceous legumes have been tested in small plots and on a larger scale under grazing. Under an average annual rainfall of 950 mm, *Alysicarpus vaginalis* (CIAT 17380), *Lotononis bainesii* (cv. Miles), and *Stylosanthes hippocampoides* (cv. Oxley) have continued to increase over the years whereas after five years, Siratro declined due to poor replacement of initial plants. Six years after the legumes were introduced into a grass pasture on formerly run-down cropping land, steers have consistently produced more than 400 kg of liveweight gain per hectare per year, with grass-legume pastures tolerating stocking rates of up to 2.5 steers per ha. These liveweight gains compare well with production obtained from freshly cleared, virgin bushland soils.

Legume seed multiplication and availability used to be a problem but, in the Paraguayan Chaco, legumes have been sown into more than 3000 ha of existing Pangola pastures.

## Algarrobo

Many species of *Prosopis* are considered as serious woody weeds in grazing lands in North America and Australia. However, our native *Prosopis alba* and *P. nigra* (algarrobo) produce a widely appreciated timber. Furthermore, their pods provide abundant feed for cattle and even food for indigenous people from October to December. Under-canopy grass growth is exceptionally vigorous and the canopies provide good shade. More and more farmers have decided to protect volunteer algarrobo in pastures at densities ranging from 10 to 50 trees per hectare, with some pruning to form a valuable trunk within 15 to 30 years. This silvopastoral system produces an amenity landscape and also sequests carbon in grazing lands.

*Pastures under spaced and pruned algarrobo in the dry Chaco*

# Practical Abstracts from Tropical Grasslands

## – from Vol.37, No. 2 (June) 2003

**Effect of stocking rates on animal gain, pasture yield and composition, and soil properties from setaria-nitrogen and setaria-legume pastures in coastal south-east Queensland**—by Dick Jones and Ray Jones, on pages 65-83.

The factors above were measured on pastures of Nandi setaria with Siratro or with Greenleaf desmodium or with 333 kg N/ha/yr at a range of stocking rates. Annual animal gains from all systems declined linearly as the stocking rate increased, but the legume-based pastures declined 2-3 times faster. All pastures produced the same gains over summer but the declines set in between May and October. The amount of legume in the pasture declined with stocking rate and as the years went by, but siratro was far more persistent than desmodium. Other grazing-tolerant grasses and native legumes increased at the higher stocking rates but did not produce much bulk.

Compared with the siratro-based pastures, the application of high rates of nitrogen fertiliser over a period of 20 years reduced topsoil pH, cation exchange capacity and exchangeable Ca, Mg and K, but increased organic carbon, nitrate nitrogen, exchangeable acidity, exchangeable aluminium and extractable manganese.

**The effect of frequency of milk allocation on milk production, pasture intake and behaviour of grazing cows in a subtropical environment**—by B.C. Granzin, on pages 84-93.

The daily allowance of a kikuyu grass pasture was offered in various allocations with a day, for example 75% in the late afternoon and the rest the following morning, or more evenly spaced during the night. In another study, cows received all their allowance of rye grass or prairie grass in the morning (07.30 hrs) or 66% in the morning and the rest in the late afternoon, or spread at different rates over the day. Frequency of feeding had little effect on milk production, pasture intake or grazing behaviour—with an average 424 minute spent grazing each day.

**A feeding strategy of combining tropical grass species for stall-fed dairy cattle**—by J.M.N. Bwire, Hans Wiktorsson and A.J. Mwilawa, on pages 94-100.

In the semi-arid areas of central Tanzania, mixtures of various native grasses were fed along with a concentrate supplement to penned dairy cows. A mixture of *Cenchrus ciliaris* and *Cynodon plectostachyus* produced most milk.

**Forage yield, nutritive value, feed intake and digestibility of three grass species as affected by harvest frequency**—by Ngo Van Man and Hans Wiktorsson, on pages 101-110.

The grasses tested on this acid sandy soil of southern Vietnam were elephant grass (*Pennisetum purpureum*) and cultivars 280 and I.429 of guinea grass (*Panicum maximum*). In all grasses, yield increased but quality declined with increasing length of cutting interval. The guinea grasses had higher yields and quality than elephant grass with cv. 280 best. Intakes by cross-bred Holstein heifers were also highest with cv. 280.

The frequency of cutting for optimum balance between yield and quality seems to be 6 weeks.

**Influence of seedbed preparation and grazing management on seed production for four tropical legumes in the establishment yea**r—by Cam McDonald, Dick Jones and Syd Cook, on pages 111-118.

Wynn cassia, siratro, Seca stylo and fine-stem stylo were sown into native speargrass (*Heteropogon contortus*) using different seedbeds—full preparation, various minimum till techniques and oversowing—during a series of low rainfall years. Only Wynn cassia consistently produced seed in the year of sowing, and then only in the fully cultivated seedbed. Early-sown Wynn cassia can drop 3000 seeds per square metre. In another study, Wynn cassia again produced the most seed followed by fine-stem stylo whereas Seca stylo and siratro produced very little. Surface sowing is likely to fail in dry years while min-till will result in a slower build-up of legume than after full cultivation. Pastures oversown using minimum till can be grazed immediately after sowing but should be destocked when the legumes start flowering.

**Nitrogen cycling in degraded *Leucaena leucocephala–Brachiaria decumbens* pastures on an acid infertile soil in south-east Queensland, Australia**—by S.T.M. Burle, Max Shelton and Scott Dalzell, on pages 119-128.

Forage and animal production from these heavily grazed pastures on soils unsuitable for leucaena were poor. Grazing cycled 65% of the N in the herbage but N fixed by leucaena contributed only 15 kg/ha over the 9-month period; 13 kg of this was cycled. Cattle retained 8% of the total N consumed with the rest split equally between the dung and urine.

## – from Vol. 37, No. 3 (September) 2003

**Effects of sown grasses and stocking rates on pasture and animal production from legume-based pastures in the seasonally dry tropics**—by Ray Jones, on pages 129–150.

A legume mixture of Siratro and Verano stylo was oversown into a speargrass-dominant native pasture in the Townsville region. Also included in 2 treatments were Rhodes grass or sabi grass (*Urochloa mosambicensis*); all paddocks were fertilised with 100 kg/ha single superphosphate every 2 years and were grazed at a range of stocking rates over 15 years.

Native perennial grasses declined as stocking rates increased, and Rhodes was the most successful grass for the first 5 years. Indian bluegrass (*Bothriochloa pertusa*) appeared in 1984 and gradually became dominant under higher stocking rates. Verano stylo was the most successful legume becoming dominant under heavier stocking until the Indian bluegrass invaded. Annual live weight gains of steers was related to the number of green grass days/yr rather than to annual rainfall. This paper provides an accumulation of knowledge gained over the decades.

**Experiences with farm pastures at the former CSIRO Samford Research Station, south-east Queensland, and how these relate to results from 40 years of research**—by Dick Jones and Geoff Bunch, on pages 151–164.

Tropical legumes and grasses from experiments at Samford were planted in farm pastures which showed how individual species persisted under farm grazing. Generally the species performed similarly in experiments and in the pastures provided the experiments were run for long enough and with appropriate grazing pressures. Short-term experiments did not show whether recruitment could compensate for the death of the original plants.

The three most persistent legumes were perennial peanut (*Arachis glabrata*), Amarillo Pinto peanut and leucaena, followed by siratro, white clover and Shaw creeping vigna. The most persistent and aggressive grass was Bahia grass (*Paspalum notatum*), followed by Queensland blue couch (*Digitaria didactyla)* and setaria.

**Spring burning and splitting of nitrogen application may affect dry matter yield and flowering of *Digitaria eriantha* (Smuts finger grass)—**by Pieter Pieterse, on pages 165–169.

In South Africa, burning Smuts finger grass while it is dormant has no effect on growth or flowering. However, burning after it starts growing in spring reduced both yield and flowering. Splitting the nitrogen application had no consistent effect on total yield but moved production towards late summer and early autumn, and reduced the density of inflorescences.

**Defoliation of *Paspalum atratum* during the growing season affects tiller and plant density the following spring**—by Rob Kalmbacher and Frank martin, on pages 170–175.

Atra paspalum pastures have declined when underutilised in summer and then frosted in winter, for example when destocked for seed production and then not grazed after harvest in autumn. When plants were not cut back, more tillers were sub-dominant in autumn. If there is no frost, these tillers would add to or replace old tillers in the next year. But after frost, the top growth is killed and prevents new tillers growing by shading them. Fertilising compounds this by increasing the top growth during summer. Cutting every month during summer and autumn results in the highest tiller numbers and these are not over-shaded. In frost-prone areas, atra paspalum should be eaten off to prevent leaf building up before winter.

**Competition affects survival and growth of buffel grass seedlings—is buffel grass a coloniser or an invader?**—by John McIvor, CSIRO Brisbane.

See the lead article on page 1**.**

**Ergot resistance in plants of *Paspalum dilatum* incorporated by hybridisation with *Paspalum urvellei***—by G.E. Schrauff, M.A. Blanco, P.S. Cornaglia, V.A. Deregibus, M. Madia, M.G. Pacheco, J. Padilla, A.M. Garcia and C. Quarin, on pages 182–186.

Interspecific hybridising vasey grass (*P. urvellei*) into a sexual biotype of dallis grass (*P. dilatatum*) and backcrossing transferred resistance to ergot to some several plants. This could be a new approach to obtain ergot resistance and improve seed production of dallis grass in Argentina.

**An observation on yield and nutritive value of *Sesbania aculeata* and its feeding to Damascus does** – by M. Zarkawi, M.R. Al-Masri and K. Khalifa, on pages 187-192.

*Sesbania aculeata,* a fast growing annual or biennial legume grown on salt-affected soils, was fed to does before mating and then through to kidding. Despite apparently reasonable feed quality of hay made from whole plants, half the does failed to produce kids. However, the remaining does grew well, had normal pregnancies and dropped kids that grew normally to weaning. All does had normal progesterone before mating. Those with normal pregnancies maintained normal patterns of progesterone; those that failed to conceive had abnormal patterns.

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