Tropical Grassland Society of Australia Inc.

TGS news & views

about pasture development in the tropics and subtropics

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Cows' belch - tax it or reduce it?

New Zealand is introducing a methane tax on ruminants—to pay for research into ways of reducing belching. Another article in a local newspaper had a conservationist saying the true figure for a tax on ruminants in Australia should be $30 per head. This would make it even more difficult for Australian farmers and graziers to remain profitable when having to compete for world prices. But then many conservationists would like to see all exotic ruminants, cattle and sheep, removed so that the grazing lands can return to a 'natural' pre-European settlement state.

Leading the world?

Australia has one of the highest rates of Green House Gas (GHG) emissions in the world and the government, despite not signing the Kyoto Agreement, has undertaken to reduce emissions. But one of the problems with these world rankings is how the figures are presented—as per capita or per head of population. We have a small human population relative to our livestock population and livestock are considered an agricultural, and hence human-induced, activity, with methane 21 times as warming as carbon dioxide. Cattle and sheep represent 14% of total GHG emissions in Australia and 80% of the emissions in Queensland.

But, on a total emission basis, Australia produces less than 2% of the world's total gasses. Our population of cattle seems to be around 30 million head, but take a look at the FAO figures for the number of cattle in say Brazil. Brazil's cattle population is somewhere between 90 million and 120 million, thus their uncertainty is equivalent to our total herd. Is anyone in Brazil suggesting a methane tax on their cattle?

Methane wasteful

Microorganisms digest plant cellulose in the rumen with methane as an (unwanted and inefficient) by-product. These microorganisms include bacteria, protozoa, viruses and fungi.

Protozoa may not be innocent and beneficial; they are almost parasitic on the bacteria. They eat bacteria for their protein but without themselves passing through to the simple stomach to be digested. This digestion of bacteria in the rumen introduces another layer of inefficiency.

Methane not from bacteria

In fact, methane is not produced by bacteria but by a group of microbes within the domain *Archaea*—called methogens—which often live in and on the protozoa. Methane is produced during methanogenesis, a process to 'mop up' hydrogen as CH_3.

Roos more efficient

Herbage digestion co-evolved in many parts of the world in ruminants and, in Australia, in the macropod marsupials—kangaroos and wallabies.

Kangaroos are not ruminants but do have an enlarged complex forestomach before further digestion; their system allows them to handle local plants that include

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Society News

Our Internet address

www.tropicalgrasslands.asn.au

See it for membership forms, an updated book list and pdf versions of the newsletter.

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

Pasture Picker

After much trial and error, we have managed to place the updated Pasture Picker on the TGS Web site. Previously the link went off to the DPI site, but as I have mentioned, politics appeared more important than giving information and many of my pages were banished.

I updated the information (most of it anyway) and have rescanned the images for better resolution. When the images were first scanned, Internet speed was too slow for good detail.

At present, there is still the old censored version of Pasture Picker on the DPI Web site but that should be changed soon. You can identify which version you are using by the colours — purple for old and green for new.

Putting material on the Web is not like publishing a book. When a book is printed, that's the job finished; when you put something on the Web that's the start of a treadmill that you cannot get off.

I'm sure there are some changes that still need to be made, and would be grateful for your feedback.

Ian Partridge

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I couldn't hop this fast with a tankful of rumen fluid in my body. My bacteria use a more efficient pathway to digest herbage.

Continued from page 1.

compounds that are toxic and anti-nutritional to exotic ruminants. It also uses a different biochemical process to mop up the hydrogen, probably by reductive acetogenesis—and these acetates can be used directly and efficiently by animal cells.

So do kangaroo microbes hold a key to reducing methane emissions in ruminants and at the same time increasing energy efficiency by up to 15%?

Dr Athol Klieve, ruminant microbiologist with DPI, has been investigating kangaroo microbes in this quest since early 2002.

Potential ways of reducing methane production include:

- antibiotics to reduce the populations of the methanogens
- viruses to do the same
- replacing methanogen bugs with reductive-acetate bugs
- use bacteria that can breakdown the methane produced before it can be emitted
- remove the rumen protozoa – which are a home for the methanogens
- use feed additives (plant oils and lipid) to reduce methane
- provide a more digestible diet.

Rumen treatments such as monensin reduce gram-positive bacteria and acidosis and methane emissions but do not last more than a few weeks.

Poor quality fibrous herbage as in our native pastures results in more methane than better quality herbage. Improving the quality of forage with more digestible grasses or with legumes can help reduce these emissions. Which is where pasture improvement could become a bargaining point should a rumen tax be considered.

I can't run too far too fast with my gut! Methane production from my rumen is wasted energy. Improved pastures reduce methane but could kangaroo microbes help?

In response to their new methane tax, New Zealand farmers have formed an action group called FART- Farmers Against Ridiculous Taxes

Glycine – a menace to acreage trees

Dick Jones and Bryan Hacker

A recent informal newsletter about planting native trees in western Brisbane, primarily along creeks, commented "Of course the recent rain has caused a spurt of growth from the ever rampant glycine. Should we be grateful for the nitrogen-rich soil it produces or should we curse DPI, CSIRO, or whoever brought it here in the first place".

Both of us have been involved in tree planting in this area for some time and, in our opinion, the writer of this item was being very charitable to "DPI, CSIRO or whoever".

Glycine is a real menace. It can smother trees of up to 10 m high (as in the accompanying photograph) and in the Brookfield area in western Brisbane it would be rated within the top 3 environmental weeds. Of even more concern is that it is probably a more recent arrival than the other nasties so is still getting worse and could well finish up as number 1. There is good evidence for this assumption as glycine was not even listed in the 1977 book "Weeds of Queensland" by Kleinschmidt and Johnson (whereas siratro was) but has been recently rated as number 19 in the weeds of south-east Queensland.

Brookside in Brookfield

In an unpublished survey in west Brisbane in February-March 2003, conducted by Bryan Hacker and colleagues and supported by Natural Heritage Trust, the extent of the problem became apparent. Three hundred sites were assessed over an area of about 150 square kilometres largely rural-residential homesites and parkland with rare areas of grazing (horses). Sites were primarily in woodland or forested areas, avoiding sites where the understorey was mown. Areas approximating 2500 m^2 were rated on a 0-4 basis, for 11 environmental weeds. Glycine was present at 122 sites and at 32 sites was a major problem. Comparing glycine with other major climbing environmental weeds, glycine rated 2 or above at 79 sites, climbing asparagus at 36 sites, Madeira vine at 22 sites and cat's claw at 15 sites.

Estimated %age cover with glycine at 300 sites in west Brisbane (2003)

Rating	Estimated % cover	no. of sites
0	0	178
1	0-10	43
2	11-25	47
3	26-75	21
4	76-100	11

Native to forest margins

Parts of the area surveyed were relict areas of native woodland or forest that are quite rare close to Brisbane City. On the fringe of such areas, particularly along creeks, glycine was frequently smothering the few remaining native trees.

Why a weed?

Why is glycine such a pest? The obvious answer would be in the combination of a strong twining ability, vigorous growth, a degree of taproot survival, ready rooting from stolons, and an ability to set a lot of hard seed, some of which can wash downstream and colonise new areas. But these attributes can describe siratro and, if you substitute scrambling for twining, also describe greenleaf and silverleaf desmodium. But although these do occur in places (silverleaf desmodium being known as velcro weed because of its incredible ability to adhere to clothing), they are not in the same menace level as glycine.

This is perhaps a little unexpected as from an agromonic view point glycine is consistently regarded as a soil specific legume – liking fertile well-drained soils of basaltic origin and requiring relatively high levels of molybdenum. In contrast, siratro and desmodiums are generally regarded as being adapted to a wider range of soils. Yet we have found glycine growing on a wide range of soils with different fertility and drainage – on one site it has even formed a very good mixture when growing with para grass on a consistently moist site.

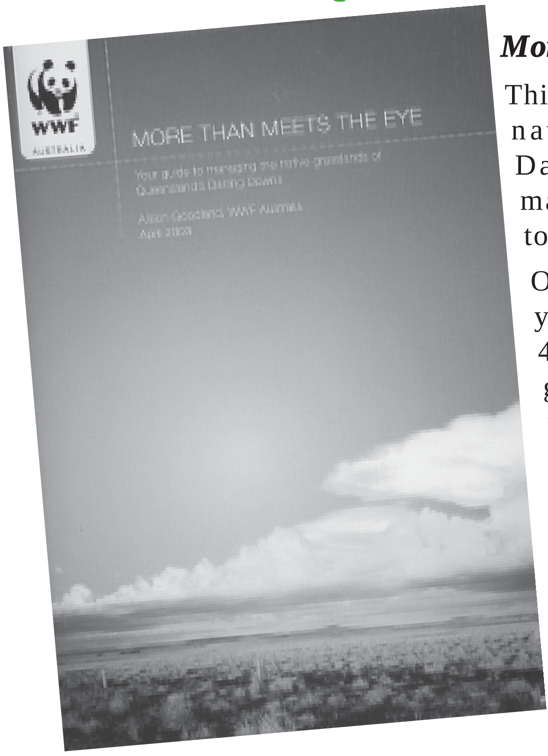
What has changed?

Perhaps part of the answer may be that because glycine is sensitive to regular defoliation when grown with a grass, it can only persist under regular grazing in grass pastures in its ideal soil/rainfall environment, such as around Kairi on the Atherton Tablelands. However, when it is not defoliated, it may be able to persist and thrive in a wider range of soil types. Around Brisbane, even quite large plants can often be pulled out by hand, suggesting that it does not produce a very robust root system and persists and spreads through adventitious roots.

It is also of interest that we have occasionally seen it growing along fences and in trees in suburban gardens. In one situation we have even found it growing up a couple of trees growing in the middle of a lawn, that we know has been regularly and closely mown for over 30 years. Perhaps these plants originated from seed set many decades ago when these areas may have been sown to pasture, but such instances further emphasise its weed potential.

Perhaps some of the blame for the particularly bad spread of glycine around west Brisbane can be attributed to the change from grazed pastures to acreage homesites, even though we do know how widely it was sown around the 1960s. It is also possible that well-meaning Councils have sown it on roadside banks for stabilisation purposes. However, the explosion in this particular 'environmental weed' re-enforces concern that while a pasture species may appear to have a limited adaptation when under grazing, it may be a very different matter if it is able to spread outside the farm boundary.

Queensland bluegrass downs and ups



More than meets the eye

This little booklet describes the native grasslands of the Darling Downs and how management can help them to recover.

Over a hundred and fifty years ago, there were nearly 400,000 hectares of native grassland downs, mainly of the native bluegrass (*Dichanthium sericeum*). But the deep, fertile cracking clays of the Darling Downs soils have been ploughed up to create the vast prosperous cropping region.

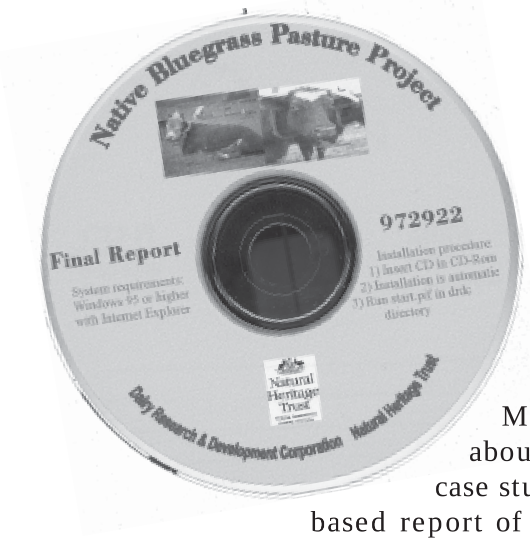
Just over 1% of the region's original grasslands remain, making the downs an endangered ecosystem.

This booklet is not just about the grasses and forbs but also about the fauna—birds, reptiles, frogs.

It describes why the grasslands are important ecologically and suggests some tips for managing the remnants.

More than meets the eye is written by Alison Goodland andis available from the World Wildlife Fund Australia, PO Box 6243, Toowoomba West Qld 4350

Queensland Bluegrass for grazing



Some of the sub-species of Queensland bluegrass from the CD (left to right - Dichanthium sericeum sub species polystachyon, sericeum and humilis)

More detailed information about Queensland bluegrass and case studies can be found on a CD-based report of the *Native Bluegrass Pasture Project*. This project was farmer-based with funding by the National Heritage Trust and the Dairy Research and Development Corporation .

In the words of Dr Wal Scattini

'This project aims to provide information that assists Darling Downs dairy farmers to make better use of native pastures, especially on their non-arable land.'

He adds that ' available soil nitrogen has greater effect than variety of grasses, including native grasses, in determining pasture yields.'

The report contains an overview of the project, information on the main pasture species including Queensland bluegrass, Wallaby grass, common wheat grass, lobed bluegrass and legumes.

Case studies of local dairy farmers who use these native species describe their management and show photographs of the pastures in various levels of utilisation.

Copies of the CD can be obtained by contacting John Armbuster of Junabee, Warwick. (Telephone (07) 4667 3188 0

Sports turf

Row over pitch may play out in court

If you don't believe turf is important, just look at the fuss created by the media in SE Queensland after the Queensland rugby league team lost the first State of Origin, and at the articles describing grass-induced injuries for Australian Rules players.

Brisbane's new stadium

The turf in the new Brisbane stadium was laid just before the match and then topped with sand to level the pitch. Questions and answers about playing in a sand pit rather than on turf can be illustrated by two letters to the press.

One letter asked '*Why did no-one have the foresight to use a breed of grass that doesn't require full sunlight?*' which assumes that there is a species that can withstand a vigorous sport, and the answers to which we covered in a more scientific way in the last issue of News and Views in John Wilson's article titled 'Why can't I grow good turf under shade?'

'Why can't I grow good turf under shade?'

See Issue No.1, Volume 19 March 2003

Another more knowledgable writer explained '*For goodness sake, the turf was laid in winter, when most critics put their own mowers in storage for several weeks owing to reduced growth.*'

As often with many urban populations, there is a feeling that machines and technology can instantly tame nature. There was another writer who queried why he had to buy imported fruit that month, quite forgetting or maybe not even knowing that a tree does not fruit throughout the whole year. Are these the same people who know all about woodland ecology?

Twisted ankles and knees

The Brisbane Sunday Mail article carried the claim that a shift from couch grass to rye grass reduced leg injuries in southern states. Couch provides better traction but too much grip can increase the risk of injury by putting excessive strain on muscles and joints. The author of a report on sports injury says that grass type, grass density, the weather and the type of studs on boots all contribute.

Scoop foiled!!

But watch this space in the next issue!

I had a photo of a DPI-designed machine for comparing the shear strengths of the root systems of different turf species, but was asked to hold it back until it is officially released—when it will no longer be relevant to my article.

I asked Errol Weston to write a piece about sports turf from a player's point of view. Errol retired from the DPI after decades of working with pastures, both native and improved but with a long-standing interest in turf grasses. He has been a hockey (nearly typedhooky) player throughout his life and has played internationally with the hockey veterans.

Errol's article is on the next page

A player's view of turf

Errol Weston, previously with the DPI

What do I look for in a playing field?

My sport happens to be hockey so that colours my thinking; my bias is probable towards 'trueness' of surface. However as a retired Pasture Agronomist I also have a commitment to the use of old fashioned grass for a range of sports.

Player needs: As a veteran sportsperson my needs are not greatly different to those of the younger player. Trueness of surface so that the ball rebounds in a predictable manner. A firm surface but with some 'give'. This seems to have been important in minimising the long-term wear factor on legs and hips.

Grass has the advantage that it does not tear the skin when you make contact. A little 'grass burn' occasionally and some marks on the clothes but not much damage generally. This is in contrast with the early sand-filled synthetics that not only tore the skin but also seemed to carry a high germ load leading to infection that needed to be treated immediately to prevent difficult-to-heal sores. Even modern 'water-base' synthetic surfaces seem to carry a range of different germs. Perhaps the microflora of the grass sward keeps sore-forming organisms to a minimum!

The every-day sports person or parent looks for a playing field that is available at the weekend and can be used with a minimum of fuss.

Unfortunately (or fortunately depending on your viewpoint) while sports clubs were debating the apparent high cost of field preparation along came the 'much more expensive synthetic 'turf'.

Synthetic 'turf'

For a long time there has been sufficient technology to prepare a grass (of the low growing kind) surface of the highest precision (the bowling green surface is a good example). Unfortunately sportsmen and women could not widen their thinking to take this technology to the bigger field, believing it would be too costly.

In hockey, for a number of reasons, the door was opened-up to the use of synthetic surfaces, known as 'turf' (grass is grass and synthetics are 'turf'). The irony is that turf costs about $0.5M+ and has a life of about 10 years; a cost that was never entertained for grass preparation. How good a grass surface could have been achieved with $50 000 a year?

Beware the synthetic

The message is that with enough money the needs of most sports can be accommodated with synthetic materials and provide a playing field which is always available, always 'true', needs minimal preparation (time and skill) and requires no time for recovery. Some of the downsides are that players are now required to play day or night and on almost any day of the week. This 'concentrating' of fixtures provides greater revenue from one expensive field. However, I don't really enjoy playing at 9.00 pm on a cold winter night. By contrast it's very pleasant to be out in the sun on a winter's afternoon.

A Pasture agronomist's point of view

Southern belles: So the tough southern players can't handle the northern grass in the sport where the big boys fly. Perhaps they should look to their footwear? Or is it that 'any excuse is better than none!' and the northern boys are just too good.

The question is – 'Should we fit the grass to the sport, or the sport to the grass'. The player (clients) may want the former, the Pasture Agronomist the latter. In fact, we probably need a little of both.

Knowledge of the sport

Certainly there are different needs for different sports and an awareness of the needs of the sport is important. However the Agronomist needs to be on guard against 'old-wives-tales' and to defend the needs of the best adapted grass species when there is real data on its growth needs. We could go back a decade or two when race-horse trainers demanded a running track with 10-15 cm depth of grass to ‘protect young horses legs against damage’; too bad about the over-mature, unthrifty and diseased grass. When pasture specialists insisted that grasses like kikuyu would perform better at a maximum height of 5-8 cm and that the overall running surface would be superior, young horses did not, in fact, fall over with ruined legs.

Adapted grasses

In selecting a grass for a particular district, being well adapted should count for a lot of points. Take kikuyu in the fertile tableland areas like Toowoomba. While it has some shortcomings it grows so well in summer it can be the major weed of a field sown to other less competitive grasses.

Grasses can be modified

If grass is well adapted, then it can be managed to provide a range of different surfaces; poorly adapted and it will always struggle. In the subtropics, Transvaal couch previously grew on many bowling greens. It has now been replaced by Tifdwarf. With appropriate management these *Cynodon* spp. are progressively mowed down to ’20 cents’ (the gap below the cutterbar) or a couple of millimetres and survive quite happily. While kikuyu may prefer a turf height of 5-8 cm, with careful management it also can be prepared as a ‘fast’ surface at 2 cm for field sports such as hockey and soccer.

What do we need in a grass

Able to respond quickly during the growing season and, in a perfect world, also in the off-season of the particular sport. Unfortunately there is pressure on playing fields for more and more use in both summer and winter.

However, there is a limit to what plant growth will do and if hard-wearing sports like summer touch football and winter rugby league are combined then grass will often fail. The wear factors of cricket (only moderate) are compatible with rugby league although the surface needs of cricket (fast, relatively true outfield from the start of warm days in spring until autumn) is not highly compatible with the winter sport that requires a deep, mature sward in autumn. Compromise is needed with respect to adjusting grass height between seasons.

Defending the grass field

Pasture agronomists need to explore the positives of grass sporting fields to counter the advance of the synthetic ‘turf’ (they have even taken the traditional name). Some positives (in no special order) are:

- the aesthetics of the natural surface set in a landscape which lifts the spirit and not just the competitive urges.

- lower player wear and tear to reduce long-term injury and prolong participation (from one fortunate veteran player).

- ball games played on grass have their own special attractions; grass has its own impact on the game (the movement of the ball; the speed of the play)

- ability to keep the cost of playing sport down. It is becoming increasingly costly for ‘a family’ to participate.

Bellyache bush under new management?

At this stage, bellyache bush can be controlled with fire

Mechanical or chemical control for really dense stands

The jewel bug may reduce seed set in scatttered stands and prevent the bush from spreading.

Large infestations of bellyache bush (*Jatropha gossypiifolia*) now cover many riparian zones in the Burdekin River catchment in Queensland, and it is increasing around Katherine in the Northern Territory. It can be seen around the town of Wyndham in the Kimberly area of Western Australia, and covers whole hillsides that once were grassland in islands such as Sulawesi in Indonesia.

Bellyache bush is another ornamental introduced to Australia in the late 1800s that has escaped to become a serious weed — with all parts highly toxic to stock.

"In the tropics of South America it was used in folk medicine to treat wide ranging ailments, although its common name could have come about because it is the cause of bellyache, rather than a cure for it," says CSIRO entomologist Dr Tim Heard.

Scattered small plants are very susceptible to fire but once a stand becomes dense there is little grass for fuel. Old belly ache bush can be controlled by slashing during the growing season before the plant accumulates sugar but mechanical treatments are not practical or economical for rough rangeland.

Call in the bugs

Biological control can be well suited to controlling widespread introduced weeds, but the control agents have to be checked to ensure that they will not have deleterious effects on native or useful plants.

The bellyache bush jewel bug (*Agonosoma trilineatum*) was discovered by CSIRO entomologists during surveys in the American tropics. This insect is the first biological control agent to be used against the weed anywhere in the world.

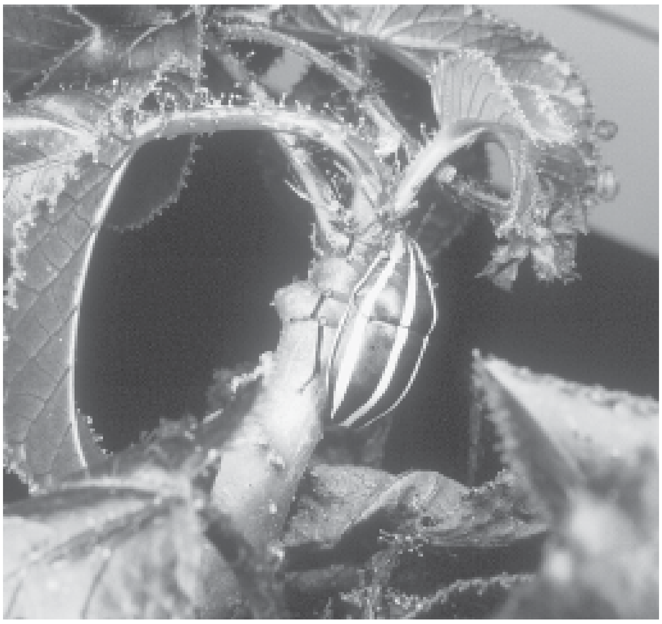
These plant-sucking bugs are specialised feeders that cannot feed or develop on any other plant species.

Both adults and nymphs feed exclusively on the flowers and fruits of the bellyache bush. If jewel bug populations reach high levels, seed should be damaged and hopefully destroyed. Any reduction in seed set should limit the spread or expansion of bellyache bush.

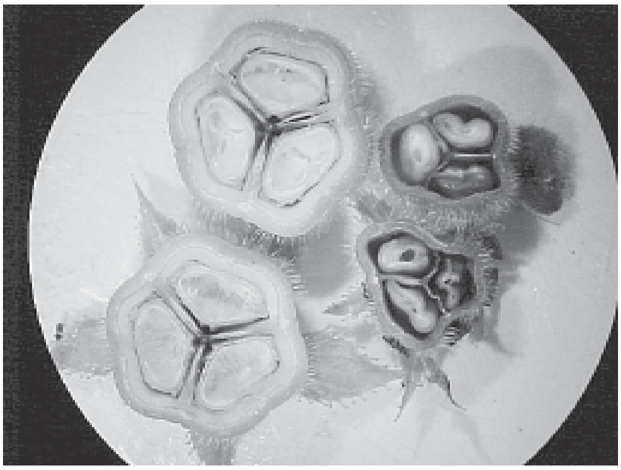
The first shipment of jewel bugs from CSIRO was received by the Tropical Weeds Research Centre in Charters Towers earlier this year. The first release on a property was of 240 adults near Charters Towers in early June, followed by two more releaes totalling over 400 adults alongside the Burdekin River. This will test whether the bugs can establish successfully in the field.

Once numbers of the jewel bugs have been reared, controlled releases will identify the best strategies for control of the weed.

This biological control work is a collaborative project between CRC for Australian Weeds Management, the Queensland Department of Natural Resources and Mines and the Northern Territory Department of Infrastructure, Planning.



A jewel bug feeding on bellyache bush



The bellyache bush seeds on the right have been damaged by the jewel bug.

It's that time of year with misty mornings and dew on the spiders' webs. When a walk through eucalypt woodlands in the fresh air brings relief from memories of tropical summer temperatures.

It's that time of year when the seed heads of native millet blow onto the fencelines.

Practical Abstracts

from Tropical Grasslands Journal, Volume 37, No. 1 (March 2003)

The response of *Panicum maximum* to a simulated subcanopy environment. 2 Soil x shade x water interaction — by Peter Durr and J. Rangel, on pages 1-10.

While trees generally have an adverse effect on the grass growing under their canopy, sometimes they can be beneficial. Guinea grass was grown under variable shade and water stress. Grass production was less reduced but less so (higher water use efficiency) with soil from under a raintree (*Samanea saman*). This suggests that better grass growth under trees in a subhumid climate is due to increased soil fertility- but only under moderate shade levels.

Nitrogen fixation and growth of cowpea (*Vigna unguiculata*) and yam bean (*Pachyrizus erosus*) in a sodic soil as affected by gypsum and sulphur inoculated with *Thiobacillus* and gypsum and rhizobial inoculation — by Newton Stamford, A.D.S. Freitas, D.S. Ferraz, A. Montenegro and C.E.R.S. Santos, on pages 11-19.

In a saline Brazilian soil, yam bean grew much better when either gypsum or inoculated sulphur were applied, and this was improved with commercial rhizobial inoculation. On the other hand, cowpea was less tolerant of salinity and grew poorly. It responded to the soil ameliorants, especially to lower levels of sulphur, but was adversely affected by the increased acidity from higher levels of sulphur. Thiobacillus would be furnished to farmers in coal or peat inoculants following further work.

Evaluation of forage legumes and grasses on seasonally waterlogged sites in north-east Thailand — by Mike Hare, C. Kaewkunya, P. Tatsapong and M. Saengkham, on pages 20-32.

Lee American joint vetch produced over 14 t/ha of dry matter at one site, but it and other legumes did not persist beyond the second wet season. Perennial stylo (CIAT 184) persisted only in places that were not deeply waterlogged. No legumes performed well enough to be recommended for seasonally waterlogged sites under repeated frequent cutting.

Ubon paspalum (*Paspalum atratum*), plicatulum and Splenda setaria were the best grasses on deeply waterlogged sites. Purple guinea grass produced more than 30 t/ha in a 6-month wet season on less waterlogged sites. Ruzi grass, signal grass and Jarra digit grass grew well on sites that did not become inundated with water.

Managing rhodes grass (*Chloris gayana*) cv. Callide to improve diet quality 1. Effects of age of regrowth, strip grazing and mulching — by Wayne Ehrlich, Tom Cowan and Kevin Lowe, on pages 33-44.

A paddock of irrigated, nitrogen-fertilised Callide Rhodes grass was open grazed on a 2-week cycle or grazed on a 2, 4 and 6-week daily strip grazing rotation. In a second experiment, 2-paddock two-weekly open grazing with and without mulching (slashing) was compared with a 28-day rotational cycle with and without mulching after grazing.

Overall the amount of pasture available increased as the grass regrew but this did not affect leaf quality. Mulching reduced yield by 50% but resulted in higher protein and lower fibre.

Milk yield was not affected by the age of regrowth; it was increased by mulching strip-grazed pastures but reduced if mulching significantly lowered the amount of leaf available.

These pastures can support up to 3.7 cows/ha but radical differences in grazing management resulted in only small differences in animal production. Under strip grazing, the costs of mulching reduced marginal returns from $ (AUD)145/ha to $66/ha.

Managing rhodes grass (*Chloris gayana*) cv. Callide to improve diet quality 2. Effects of stocking rate and irrigation frequency — by Wayne Ehrlich, Tom Cowan and Kevin Lowe, on pages 45-52.

Nitrogen-fertilised Callide Rhodes grass in south-east Queensland were stocked at 3.5, 5.25 and 6.1 cows/ha from January to May and irrigated every 2 or 4 weeks. Although the amount of pasture decreased at the higher stocking rates, milk yield per cow was unaffected at 16.6 kg/day. However, at the higher stocking rate, the cows lost weight. Less frequent and lower volume of irrigation resulted in lower levels of soil water, but did not affect milk production until the last 3 weeks of the trial.

That the pastures could maintain growth with half the irrigation water suggests that efficiencies may be gained with closer monitoring of soil and pasture. Irrigating every 4 weeks, grazing at 6 week rotations and stocking at 3.5 cows/ha comprises the most efficient use of tropical grass pastures in late summer and autumn.

Current range condition in southern Ethiopia in relation to traditional management strategies: the perceptions of Borana pastoralists — by Ayana Angassa and Fekadu Beyene, on pages 53-59.

Ignoring the traditional knowledge of the indigenous Borana pastoralists during development programs has resulted in serious environmental degradation, loss of resilience and impact on the livelihood of the people.

In any development endeavours, traditional values and knowledge should be included.

June 2003, Vol 37, No.2

Effects of stocking rate 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 top soil under the legume pasture was less acid and had higher CEC and exchangeable calcium, with lower nitrate and lower exchangeable aluminium and manganese than pasture fertilised for 22 years.

Siratro and greenleaf demsodium were planted but the latter effectively died out after 4 years of continuous grazing. Siratro persisted at lighter stocking rates but was minimal (1-4%) after 24 years—although autumn spelling could increase it to 10%. Many unsown creeping species, including native legumes, invaded in heavily grazed legume pastures. These included sedges, blue couch, carpet grass and Bahia grass but only blue couch invaded the nitrogen-fertilised pasture. Setaria persisted better at higher stocking rates when fertilised.

Animal production declined as stocking rate increased but the rate of decline was 2-3 times greater in the legume pastures with the effect higher during winter and spring than in summer. Animal production was much more closely related to feed available than to the mineral composition of the pastures or faeces.

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

Providing fresh grazing more frequently might improve milk yields as cows do not like grazing fouled pastures and prefer night grazing to avoid high day temperatures in summer. Also ryegrass pastures have their highest energy concentrations in late afternoon.

Splitting the kikuyu pasture grazing to provide three quarters after the afternoon milking or as 2, 3 or 4 allocations during daylight hours. had no effect on pasture intake, milk production or liveweight change.

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

Penned dairy cows were fed different combinations of common species found naturally in central Tanzania, with ad lib supplement. Buffel grass, star grass and *Rottiboeria* produced most herbage, Rhodes and black speargrass the least.

Hay was made by cutting the species at

flowering stage by selecting individual plants within the grassland. Intakes for all rations and milk yields were similar but the buffel and star grass mix was a better feeding strategy with the highest digestibility, metabolisable energy and crude protein. Supplements of concentrate or browse should be fed to improve diet quality.

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.

Smallholder farmers in southern Vietnam often allow elephant grass to grow too tall and stemmy between harvests. This trial reinforced the well-established principle that longer intervals between harvests provide more grass but of lower quality. Small-leafed guinea grass (cv. 280) produced both higher yields and more digestible dry matter and crude protein, followed by broad-leaf guinea grass cv. I 429 and then by elephant grass (King grass). Cattle intake of the grasses was in the same ranking, but cutting interval did not seem to affect intake. The optimum cutting frequency for dairy cattle seems to be 6 weeks although it could be up to 8 weeks with elephant grass.

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

Legume seed spread on the soil surface often fails to establish in dry years. Minimum-till techniques are more reliable but the legumes set much less seed in the first year than when sown in a cultivated seedbed. This slower build-up of legume in the pasture could lead to failure. Seed production in the first year from minimum-till sowings is generally better if planted early in the wet season (November-December). These pastures can be grazed immediately or soon after sowing, but should be destocked when the legumes flower.

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.

On infertile soils, leucaena and grass may start vigorously and then decline, possibly because chemical imbalances inhibit nitrogen fixation. A leucaena-based pasture on an acid infertile soil was grazed to study the nitrogen in the pasture, soil, cattle and dung and urine.

Grazing cycled 65% of the nitrogen in the pasture herbage through dung and urine but this is vulnerable to volatilisation and leaching. But plant nutrient imbalance (low N, P and Ca and manganese toxicity) reduced N-fixation by the leucaena to only 15 kg/ha N over 9 months so that the pasture was neither productive nor sustainable. Matters could be improved by ameliorating the soil infertility, by eating less of the leucaena to promote cycling through leaf fall and by synchronising N cycling with the demand by the grass (i.e. grazing in summer).

Lateral thinking or just stupid?

That water grass, hymenachne, was recently in the press again for invading water ways in north Queensland.

"***Department blamed as weed chokes waterways.*** A noxious weed introduced by the Department of Primary Industries to feed cattle has spread into Queensland waterways. CSIRO sustainable ecosystems program said an environmental crisis was looming and that hymenachne could spread tenfold in the next three years."

A new release classifies Hymenachne as a 'pest' so that seed or planting material cannot be sold.

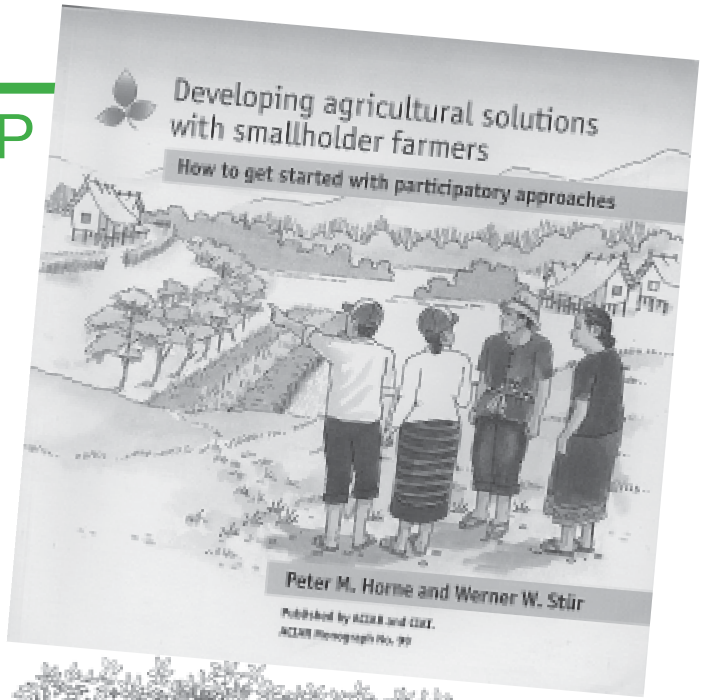
Another news item was that a Queensland university was going to reduce sediment in our rivers. It turned out to be a press release about a post-graduate research project that was measuring flow and sediment rather than a solution to the problem.

We are told nutrients and silt from the coastal rivers are ruining our priceless Barrier Reef, an icon for our large tourist industry.

Hymenachne grows very well in nutrient-laden water; it removes these excess nutrients—a bit like using wetland grasses to clean up effluent. And the grass helps trap silt before it reaches the ocean and reef. Could this silt be used to build up new valuable land, fertile and, unlike mangrove soils not acid-sulphate.

Could we ***use*** hymenachne in a managed way to reduce damage to the reef (and to grow beef) rather than trying to ban something already out there?

And another gem from FSP



Peter Horne and Werner Stür have produced another excellent little book in their series from South-east Asia.

Developing agricultural solutions with smallholder farmers: How to get started with participatory approaches describes an approach used by 'specialist' development workers to help smallholders integrate forages onto their farms.

Traditionally extension workers have promoted new technologies and government programs sometimes with success, often without.

Common reasons for lack of success include;

'Often we simply did not understand farmer's needs, assuming that improved productivity alone was enough to ensure adoption.'

'The huge variation in resources, opportunities and constraints between farm household means that no single technology can be appropriate for all farmers.'

Farmers seldom adopt fully developed technology packages. Rather they look for 'ingredients' which they can put together in different ways to fit their particular needs. They adapt rather than adopt technologies.

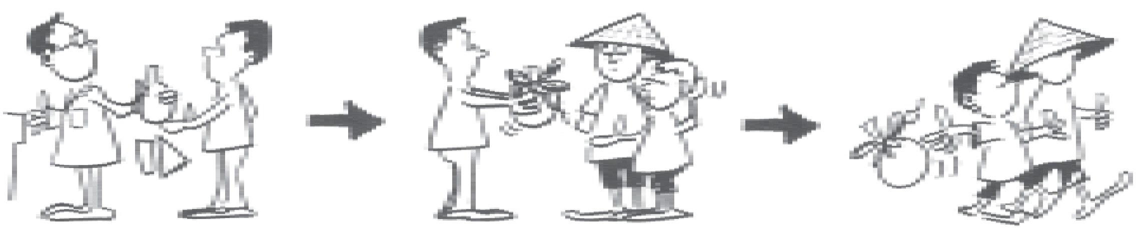
Approaches tried by the authors include consulting more with farmers and allowing them make the decisions.

Methods they have used involved:

- first selecting a suitable village
- talking about and agreeing on the problems with a focus gropu of villagers
- looking for technology options
- testing and evaluating these options
- meeting with focus groups and reporting back to the villagers
- integrating promising options on some more farms
- spreading the word and reaching other farmers
- reaching other villages.

Books are available from CIAT, PO box 783, Vientiane, Lao PDR, e-mail ciat-asia@cgiar.org and from TGS Book Sales in Brisbane.

Delightful drawings by Tingkham Sengaphay (above) and cartoons by Dave Daniel (below) are worth a thousand words.



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