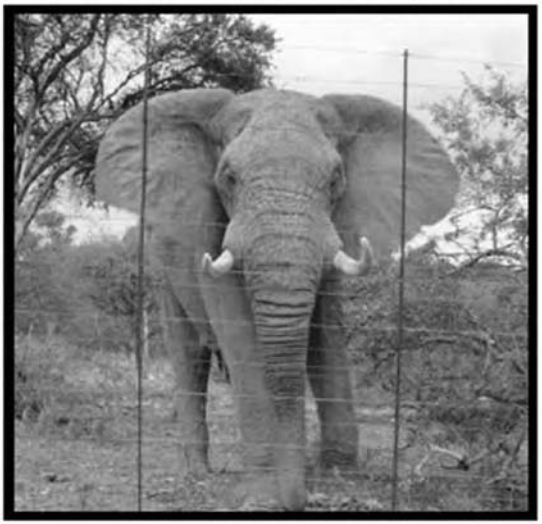
grass roots

Newsletter of the Grassland Society of Southern Africa

Incorporating Vol. 15-2 of the Bulletin of the Grassland Society of Southern Africa
ISSN: 10166122 • Vol.5 No.2 • May 2005



One way to control bush encroachment... Just how strong is that fence?
Private game ranch near Musina.

MAY 2005 - in this issue:

2 Editorial
3 GSSA Council 2004/05
3 Council News
4 Congress 40: Update
5 Congress 40: Endophyte in Pastures
6 Congress 40: Complex Adoptive Systems Management
8 Congress 40: Call for bids
9 Congress 40: Communal Rangelands
10 SA Large Herds Conference 2005
13 MPO/GSSA Dairy Farmer Symposium
14 Short-Term Influence of Fire in a Semi-Arid Grassland - on (1)Productivity
19 Opinions
21 Awards
24 Congress 40: Registration Form
24 GSSA Tour: Bush Encroachment in the Limpopo Province

P.O. Box 41 • Hilton • Pietermaritzburg 3245 • South Africa
Tel: 033 390 3113 • Fax: 033 390 3113 • Cell: 083 256 7202
e-mail: admin@gssa.co.za • http://www.gssa.co.za

EDITORIAL

Dear members

This is the last issue of *Grassroots* before the 2005 Congress. According to the organising committee, we're likely to have a healthy turnout this year, including an encouraging response from non-members of the GSSA, so all indications are that this will be a great Congress. There's still time to register and send in your abstracts, as the deadline date has been extended. You can find out more in this issue and in the previous issue of *Grassroots*, as well as on the website.

This issue of *Grassroots* is largely about housekeeping; the Annual General Meeting will be held at Congress, as usual, and there are some important decisions on the future of the Society that need to be made by members. We urge you to get involved and help the Council to decide the direction that the Society needs to take. After all, it's our Society, and we all need to guide those that have been entrusted with governing the GSSA, to ensure that the Society fulfils its mandate.

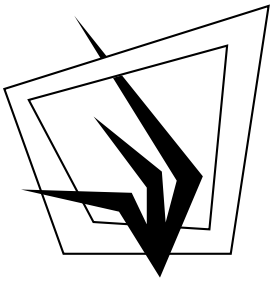
Over the years, there has been some criticism from members involved in pasture research that the Society doesn't cater for their interests. We are making a concerted effort to attract pasture practitioners and researchers to the Congress this year. We'll keep you updated on the programme via the website, the press and mail (electronic and snail).

On that point, it's interesting that the dichotomy between pasture- and veld-based grassland science research seems to be a largely southern African phenomenon. Of course, a great deal of work in natural rangelands is in the field of ecology trying to understand the incredibly complex interactions between factors in these systems. But the roots of the GSSA are still solidly founded on research on forage resources for game and livestock. Certainly, many people are still involved in both veld and pasture research. Cultivated pastures and veld form integrated parts of fodder-flow systems for livestock all over the country, and especially in the sourveld.

So we hope to see you all at Congress pasture and veld researchers, ecologists, economists, sociologists, conservators, technicians and managers. Everyone has a vital part to contribute to the GSSA, and the GSSA, in turn, to our constituencies.

See you in July!

Alan



GSSA Council 2004/05

News from Council

Sigrun Ammann

Dear GSSA members

The Council Exco and Council members from around Pietermaritzburg had a meeting on 20 April 2005 at Cedara. The deliberations were mostly about the up-coming Congress and the journal.

One of the aspects we discussed was the organizing of congresses in general and the problem of continuity and the fact that GSSA members have now become accustomed to contacting the administrator about GSSA matters, due to the GSSA now having a good administrative service. Future closer involvement of the GSSA administrator with the congress organizing committee will be explored and discussed further in the coming months.

The journal was also discussed, with one of the issues being the format i.e. printed versus on-line. This topic will be discussed at the AGM in July. The modern trend is on-line journals. There are, however, many people who still like a printed copy on their shelf. The format that the journal takes is also linked to cost implications, which will have to be considered very seriously.

The Council feels encouraged about the way *Grassroots* has now re-established itself as the bulletin of the GSSA and hopes that members will contribute even more to its contents. Likewise the website is successful and user-friendly. Members are invited to visit the website and read the new additions such as the interviews that have been conducted with some GSSA members. Members are also encouraged to contact the website coordinator with contributions, resulting in a website that is interesting and useful.

At the AGM in July a constitutional change will also be debated relating to the quorum for the AGM. In recent years it has been very difficult to get a quorate meeting and in 2004 the AGM was in fact inquorate.

We are looking forward to seeing many GSSA members and others at Congress 40 at Kapenta Bay, Port Shepstone

Congress 40 update

Abstract deadline

The programme and timetable for the 40th Annual Congress is taking shape but we need your abstracts in order to finalise the timetable! For all of you who haven't yet registered or sent in your abstracts, the **deadline for abstracts** has been moved to Friday, **3 June 2005**.

Registration forms are available on the website, or contact Richard Hurt using the details below.

Abstract format

The format for abstracts can be found on the website, or contact Richard Hurt at the details below. Abstracts should be written in accepted scientific style and should report the important results of your research or thinking, without references. The final editing will be carried out by the Congress organisers.

New sessions

Three exciting sessions have been finalised: Sigrun Amman is coordinating a symposium on endophyte in pastures, to which farmers have been specially invited. Susi Vetter is coordinating a series of presentations and a discussion around the kinds of knowledge required for successful intervention in communal rangelands; and Christo Fabricius has arranged a series of presentations and discussion on complex adaptive systems. Further details of these sessions can be found in this issue of *Grassroots.*

Proposed sessions

A number of other possible sessions have been proposed, but need to be finalised. If you have any ideas of your own, contact:

Alan Short
Email: Alan.Short@dae.kzntl.gov.za
Tel: 033 3559 204
Cell: 072 372 9099
Fax: 033 355 9605

Themes

The organisers will be flexible in their arrangement of sub themes within the main themes, according to the contributions of workers. As examples, some possible sub-themes within the main themes are:

1. Rangelands providing forage for livestock and wildlife

- forage assessment & fodder flow planning
- alternative & supplementary forages (pastures, agroforestry)
- fodder crop improvement
- evaluation & monitoring of resources
- production, forage quality
- animal & vegetation management
- rehabilitation

2. Rangelands for biodiversity conservation and ecosystem maintenance

- assessment & monitoring of diversity (fauna & flora)
- function & value of diversity
- critical ecosystem processes (plant, community, landscape, regional)
- the hydrology of rangeland catchments
- models for rangeland conservation (conservancy to trans-frontier parks)
- Management of biological invasions
- Scale related issues (point, plot, landscape, regional)

3. Rangelands for people and development (settlement and urban expansion)

- environmental impact assessment for development
- invasion & (re)settlement of rangelands
- social/community aspects of rangeland management

Papers that address broad issues within the context of a theme, or present the results of research in a broader context, will be accepted to be presented as platform presentations. Other papers will be accepted as poster papers, provided they meet accepted standards of language and science. The aim of this Congress is to have strong representation from diverse interest groups involved in rangelands and pastures, both in the posters and the platform presentations.

Contact

For more details, contact:

Richard Hurt
e-mail: rich@mindmap.co.za
Tel: 033 345 3146 / 082 887 1082
Fax 033 394 6687

Or see our website: www.gssa.co.za

Grassland Society of Southern Africa

Will endophytes control insect damage and improve pasture persistence?

You are invited to attend an Endophyte in Pastures Symposium

Hosted by GSSA Congress 40

Thursday 21 July 2005
09:30 at Kapenta Bay Hotel, Port Shepstone

What are endophytes?

Endophyte infection of perennial ryegrass and tall fescue pastures to minimize insect damage is of major importance overseas and is becoming an increasingly relevant topic of discussion and debate in the pasture industry in South Africa. There is, however, very limited knowledge in South Africa about endophyte in pastures, the chemicals they produce and their potential negative effects on animal health. Likewise the knowledge of insects in pastures is scant.

The **purpose of the Endophyte in Pastures Symposium,** taking place during the GSSA Congress 40, is to bring together as much information about this topic as possible. Most importantly we need to start the discussion process on endophyte in pastures, the associated insect control and animal health implications to determine and prioritise the knowledge gaps on endophyte for South African pastures.

We are calling all pasture farmers, advisors, extension officers, pasture and animal scientists to participate in this Symposium. Your attendance is essential.

Endophyte in pastures Symposium programme:

- **Registration**: 08:00 to 09:30
  R150 includes tea and lunch (Free for Congress Delegates)
- **Symposium starts** 09:30
- **Tea** 11:30 to 12:00
- **Symposium continues (discussion)** 12:00 to 13:00
- **Lunch** 13:00

To register contact:
Richard Hurt
e-mail: rich@mindmap.co.za
Tel: 033 345 3146 /082 887 1082
Fax 033 394 6687

Chairperson: Prof Wijnand Swart
Chair of Centre for Plant Health Management, Dept of Plant Sciences, University of the Free State

1.	***Introduction: aims of the symposium***	**Sigrun Ammann**
2.	***Endophyte in pastures***	**Prof Wijnand Swart**
3.	***Review of endophytes in tall fescue***	**Dave Goodenough**
4.	***Insects in pastures in the Tsitsikamma***	**Frank Weitz**
5.	***Insects and endophytes in pastures***	**Prof Schalk Louw**
6.	***Ryegrass endophyte: the past, the present and the possible future in South Africa***	**Jan Coetzer, Agricol**
7.	***Discussion***	

***** SEE NEXT PAGE FOR REGISTRATION FORM *****

ENDOPHYTE SYMPOSIUM REGISTRATION FORM

Copy and fax or e-mail to Richard Hurt at

e-mail: rich@mindmap.co.za

Tel: 033 345 3146 / 082 887 1082, Fax 033 394 6687

(Free for Congress Delegates)

Title:		Initials:		**No. of people attending (R150pp)**			
Surname							
Attend	**Endophyte Symposium on Thursday 21 July 2005 at Kapenta Bay Hotel**						
Address:							
City:		Postal Code:			Country:		
Tel:		Fax:			Cell:		
E-mail:							

Proposal for a GSSA panel discussion: Complex Adaptive Systems Management in southern Africa: challenges, practice and an agenda for action

Christo Fabricius, Harry Biggs, David Cumming, James Gambiza, Line Gordon and Tim Lynam

At a round-table discussion on 9 November 2004 at Morgan Bay near East London, the above group of researchers and practitioners undertook to promote the sharing of lessons about managing complex adaptive systems in southern Africa. We agreed to stimulate this through, amongst others, publications, symposium presentations and training courses.

One of the activities identified was to propose a 3-4 hour panel or 'mini-workshop' on Complex Adaptive Systems management at the next GSSA meeting in Port Shepstone, 18-22 July 2005. Potential panel participants include Harry Biggs, David Cumming, Christo Fabricius, James Gambiza, Tim Lynam (the Morgan's Bay round-table members), and other scholars such as Nicky Allsopp, Richard Cowling, Howard Hendricks, Kevin Rogers, Susi Vetter and Coleen Vogel.

Background

The study and management of complex adaptive systems addresses the challenge to a) understand systems that are highly dynamic and ecological events that are often unpredictable, b) develop concepts and models to strengthen the co-management of natural resources; c) adaptively manage social-ecological systems, and d) merge an array of knowledge systems to develop new insights into complex systems management. There is a need to strengthen this 'community of practice' by identifying opportunities for regional and international networking, and

hence a need to formulate a plan of action. Importantly, there is also a need to disseminate some of the the practical and theoretical insights gained up until now, to highlight the value and importance of understanding complex adaptive systems in southern Africa.

The characteristics of complex adaptive systems in a southern African context are:

* As in many other places in the world, social and ecological components that are highly interconnected. History, politics, culture and management systems in southern Africa are inextricably linked, and form a complex web of causalities, responses, interventions and feedbacks which is not only difficult, but also undesirable, to disaggregate.
* As in many developing rural countries, there are in most of Africa, usually only short links between consumers of ecosystem services, and the resource base. Millions of people in southern Africa live in, and depend directly on ecosystems for their survival. Ecosystems and their services in rural areas are the cornerstones of social capital, and compensate for the lack of financial capital in people's livelihoods.
* What seems more characteristic of Africa per se is the combination of high variability (e.g. hydrometeorologically, this being one of the chief drivers in the system), high uncertainty, and the many, and frequent, surprise events such as droughts, floods, fires, epidemics, social unrest, policy change, economic fluctuations and power shifts taking place in the sub-region. There are also many uncertainties around population trends, HIV/AIDS projections, economic growth rates, climatic change and policy evolution in the sub-region. This signals an unpredictable but exciting range of plausible futures for the sub-region and high disparities in the wealth, formal levels of education, health and access to resources, both within groups and between them.
* As a consequence high, but variable, levels of resilience, transformability and adaptability underpin the outcomes of complex processes. Social and ecological processes are in a constant state of flux, and formal and informal institutions are sometimes very flexible and unpredictable.
* Thus the manager's challenge is to deal with complex adaptive systems which are highly variable in space and over time, social processes and institutions that appear to be in a state of 'disorder', institutional flexibility and adaptability which makes formal co-management particularly challenging, and adapt to covert layers of social and institutional organization that are often obscure to outsiders. This is further complicated by weak capacities in most formal management agencies to engage with and understand these complex processes.

These characteristics highlight and bring to the fore the importance of understanding complex adaptive systems management in southern Africa. Southern Africa is ready for conceptual and practical contributions and interventions that would increase its resilience, and with the system in the state described above, it is feasible that correctly-timed and appropriate interventions could go a long way.

In 2004 the need was identified to broaden and strengthen the existing community of practice by engaging like-minded individuals in South Africa, thereby catalyzing the Morgan's Bay round-table.

Why strengthen studies and experiments in complex adaptive systems management?

The reasons for strengthening a community of practice in complex adaptive systems understanding and management in southern Africa are that:

* We are enthusiastically looking for new challenges, intellectual stimulation and opportunities to enjoy participating meaningfully - with a fresh and useful mindset - in many of the intriguing places in Africa;
* Southern African scholars and practitioners have important theoretical and practical insights to share with the global resilience community;
* We would like to share theoretical and practical lessons through case studies where social-ecological systems are in a constant state of flux and re-organization;
* We would like to make a positive difference to the way complex adaptive systems are being managed. In particular, we would like to contribute new perspectives on sustainable development in the southern African context, particularly sustainable development that addresses the challenge of high uncertainty, built-in adaptability and the need to strengthen the region's capacity to deal with frequent change, shocks and surprise;
* We have exciting ideas to share with managers.

Some of the key challenges which the group would like to address, are how to:

* Incorporate stakeholder views, and make use of multiple sources of information
* Influence and interact meaningfully with stakeholders
* Manage the expectations of stakeholders with different mental models, values and preferences.
* Bargain for the space to manage adaptively.
* Realize that management of complex adaptive systems is a political process, and that many of the slow variables are political in origin.
* Learn, understand and deal with different versions of 'the truth' about complex adaptive systems.
* Experiment with and learn about strategies and tactics for: walking the tight-rope between policy compliance and creative adaptive management; deciding when and where to use which management approach; getting the timing right; and keeping the transaction costs of adaptive co-management appropriate, usually low.

Venue: GSSA Congress 40, Kapenta Bay, Port Shepstone
Date: Thursday 21st July
Time: Presentations: 8:00-10:00
Facilitated discussion: 13:30-15:00

Contact:

Christo Fabricius
Email: C.Fabricius@ru.ac.za
Tel 083 6318828
Fax 046 6226242

Richard Hurt
e-mail: rich@mindmap.co.za
Tel: 033 345 3146 / 082 887 1082
Fax 033 394 6687

Call for Bids for 2007 Congress

The 2005 Congress is rapidly approaching, and the Limpopo Province delegates have the 2006 Congress well in hand. The time is coming to choose a location for the 42nd GSSA Congress in 2007.

We are calling for bids to host the 42nd Annual Congress of the GSSA in 2007. Please submit your proposals to the GSSA Administrator at the contact details below before the end of June.

Freyni du Toit
PO Box 41
Hilton
Pietermaritzburg
3245
South Africa
email:admin@gssa.co.za
Cell: +27 (0)83 256 7202
Tel: +27 (0)33 390 3113
Fax: +27 (0)33 390 3113

CONGRESS 40 SESSION ON COMMUNAL RANGELANDS:

What kinds of knowledge will improve the prospects for successful interventions in communal rangeland systems in South Africa?

Co-ordinator: Susi Vetter.

Background

There is increasing focus among researchers, extension services, NGOs and government departments on livestock development and resource management in communal rangelands. A considerable amount of research in a variety of disciplines has been done in South African communal rangelands since the early 1990s, and there is also an increasing body of experience in development projects of various kinds. Despite this accumulation of data and a better understanding of the ecological, economic and social aspects of communal rangelands, most development and resource management interventions are based on commercial models of improving veld condition and animal productivity. Although an increased emphasis has been placed on participatory methods in recent years, the development and research agenda is still largely driven by traditional agricultural approaches. The lack of success of many of these interventions and the low rate of adoption of new technologies and management practices by the communities suggests that there is a need to review our understanding of the way communal rangelands work and to think more carefully about the reasons why current interventions very often fail.

The aims of this session are:

- To review current knowledge of the objectives and practices of livestock keepers in communal areas and the constraints they face.
- To review types of interventions in communal areas and the reasons for successes and failures.
- In the light of the above, to identify crucial gaps in our knowledge and also to propose appropriate directions for interventions.

There are two components to this session.

The first part is a regular congress session of papers followed by discussion. The plan is to prepare platform papers, possibly with perspectives from different regions, around the following themes:

1. Livestock production in communal rangelands: what are people's objectives, practices, needs and constraints? What is the scope for interventions and improvements?
2. Natural resource management in communal rangelands: what practices and institutions are in place? What are people trying to do, and what are the constraints? What interventions have been attempted, what has the success been?
3. What is the state of communal rangelands in South Africa? What are appropriate ways of assessing the condition of communal rangelands? Is it necessary to improve resource management in communal areas?

Relevant research papers may also be included in this session.

The second part is an intensive workshop to produce a document aimed at policy makers and relevant government departments synthesizing the outcomes of the discussions. The aim is to produce an informative document focusing on how the success of interventions can be improved in communal areas.

Suggestions on the format and issues addressed are welcome. People interested in contributing to the review papers and other aspects of the session should contact Susi at the address below.

Venue: GSSA Congress 40, Kapenta Bay, Port Shepstone
Date: Thursday 21st July
Time: Presentations: 10:30-12:30
Facilitated discussion: 15:30-17:00

Contact:
Susi Vetter
Email: s.vetter@ru.ac.za
Richard Hurt
e-mail: rich@mindmap.co.za
Tel: 033 345 3146 / 082 887 1082
Fax 033 394 6687

SA Large Herds Conference Club Mykonos, Western Cape 21 - 23 February 2005

Nicky Findlay and Joanne Mann
KZN Department of Agriculture and Environmental Affairs, Cedara.
Email: findlayn@dae.kzntl.gov.za

The theme of the 2005 SA Large Herds Conference was "Where to from here? Higher efficiency: the key to profitability". The conference offered parallel sessions catering for both Total Mixed Rations (TMR) and pasture-based dairying production systems, with speakers from South Africa, New Zealand, Australia, USA, Israel, Ireland and Scotland. The event was attended by approximately 450 dairy farmers and representatives from agricultural organisations, agricultural consultancies and provincial departments, as well as a number of international delegates from New Zealand, Australia and the USA.

Topics covered in presentations included developments in genetics research, pasture analysis techniques and interpretation of results, rumen health, optimising business performance and BEE (Black Economic Empowerment). Below are reports on two presentations that have particular relevance to the South African pasture-based dairying systems.

Management of the transition cow: mineral nutrition and altering DCAD

Dr John Roche (Dexcel, New Zealand) presented a thought-provoking paper (Roche 2005) on the management of the transition cow on pasture. Of particular interest to South African dairy farmers were Dr Roche's findings on the mineral nutrition of the dairy cow during the six-week transition period where her metabolic priorities are shifted from providing nutrition for foetal growth to milk production. Mineral supplementation of grazing dairy cows during this period is aimed primarily at preventing metabolic disorders, in particular milk fever (hypocalcaemia). Hypocalcaemia is caused by a drop in blood calcium associated with major hormonal and metabolic changes that occur at calving, including the sudden demand for extra calcium for colostrum (Mönnig & Veldman 1976). As in South Africa, the focus in New Zealand and Australia has been on the dietary concentration of calcium, magnesium, sodium, potassium, chlorine and sulphur and their effects on calcium homeostasis.

The dietary cation-anion difference (DCAD) is the difference, in millequivalents/100g DM (meq), between biologically strong cations (Na and K) and anions (Cl and S) in the diet. A reduced DCAD would, in theory, reduce blood pH. A small reduction in blood pH (e.g. from 7.42 to 7.38) has been shown to increase the calcium absorption and the amount of calcium excreted in urine. For this reason the concept of reducing precalving DCAD by feeding anionic salts has become widely recommended. In his presentation Dr Roche pointed out that a DCAD of 0meq/100g or lower is required to reduce blood pH and increase Ca absorption. This approximates to 500g to 1kg anionic salts per cow per day, depending on the original DCAD and the salts chosen. Apart from being impractical in grazing systems, feeding such amounts is potentially dangerous. There are alternative methods that are more practical in grazing systems for reducing the incidence of milk fever in a dairy herd.

Magnesium is known to be important in calcium homeostasis. Minson (1990) reported on research conducted by Young and Rys (1977) where cows supplemented with magnesium displayed a decreased incidence of milk fever. Dr Roche reported research (Roche, unpublished) showing 70% of grazing cows were hypomagnesaemic (<0.8mmol/litre) on the day of calving. Thus magnesium supplementation during the month prior to calving and during early lactation is vitally important for preventing milk fever in grazing systems. Dr Roche recommended feeding magnesium supplementation daily precalving (0.35% Mg/cow/day for a month before calving).

High dietary sulphur has also been found to decrease the incidence of milk fever. Dr Roche found that $MgSO_4$ supplementation precalving appeared to be more effective in preventing milk fever than either MgO or $MgCl_2$, even though sulphur would be regarded as a less acidifying salt than chlorine. The amounts supplemented were too small to cause a decrease in blood pH and there was no evidence of an effect on acid-base status. This suggests that sulphur may have effects on calcium homeostasis that are unrelated to acid-base biochemistry.

In summary, Dr Roche suggested that, rather than focusing on the mineral effects of anionic salts on blood pH in order to decrease the incidence of milk fever, dairy farmers would do better to minimise calcium intake precalving (feed silage or hay rather than pasture) and supplement calcium post calving (Ground limestone: 150g/cow/day). Magnesium supplementation daily both pre- and postcalving is recommended.

Key profit drivers in pasture-based dairy systems

David Beca (Red Sky Agricultural Pty Ltd) spoke on key profit drivers in pasture-based dairying. Mr Beca defined profit as the return received on the capital invested in a business. By this definition any profit ratio should refer to capital (e.g. monetary value of investment, of land or of cows). Ratios that refer to milk (e.g. costs per kilogram of milk) cannot be used as profit drivers. As levels of milk production increase, two "tipping points" are reached (See Figure 1). These are firstly a higher level of risk and then secondly a reduction in profit. In the first instance milk is not a capital item like land or cows (or the combined value of all assets) but a component of revenue. Profit ratios by definition need to refer to a unit of capital. Secondly, in pasture based dairying milk production per hectare or per cow does not have a consistent positive correlation with profit. In fact at some point the relationship becomes negatively correlated to profit.

Farm size is not a key profit driver due to the high proportion of variable costs associated with pasture-based dairying. Given there are only a small proportion of fixed costs in pasture based dairying (and most of these 'fixed' costs alter proportionately with farm size), it would be inconsistent to draw the conclusion that size of farm would provide any significant advantage. It is true that very small farms would have some disadvantages due to factors such as the impact of imputed or real management costs being spread across a small number of cows along with the fixed structural costs in dairying. However once the dairy farm is of moderate size (i.e. 150-200 cows in Australia and New Zealand) then the impact of farm size has low impact.

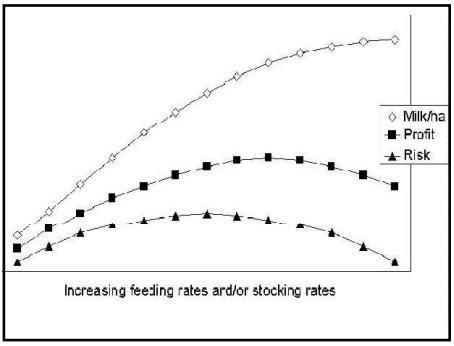


Figure 1. Relationship between Milk Production, Profit and Risk (Beca, 2005)

Mr Beca presented what he believes are the five key profit drivers applicable to pasture systems.

1. Pasture Harvest

In Australia and New Zealand, pasture is the lowest cost feed in pasture-based dairying systems. Although variable and capital costs most often boost this cost, it is usually significantly lower than the cost of any supplementary feed. The value of pasture is heavily influenced by the amount of pasture harvested per ha and as a result the most significant outcome of increasing pasture harvest is to drive down the cost of pasture and therefore the average cost of production.

2. Milk production per hectare

Increasing supplementary feeding rates to cows and/or increasing stocking rate generally lead to an increase in milk production per hectare. The response curve is curvilinear so that increasing milk production per hectare by these means generally lead to a strong positive correlation to profit when imposed on a low level of performance. Mr Beca highlighted the importance of recognising that at moderate and high levels of milk production, this correlation to profit becomes weak and then negative. This curvilinear relationship means that at some point further increases in milk production per hectare will result in a reduction in profit. He also pointed out that it is important to understand that the shape of the profit curve and the "tipping point" are farm specific. The key determinants of the shape of these curves are milk price, pasture production (or price), supplementary feed price and base cost structure.

3. Supplementary feed cost

The primary influence of supplementary feed on profit is the cost of these forages and concentrates. As with pasture this includes the purchase price (which should include any storage costs) plus the variable costs and capital costs. In addition the effects of wastage must be quantified, including both storage/bunker wastages and losses in delivery of the feed to the cows. In Australia and New Zealand, the impact of these additional costs is that the full cost of forage is usually 30% to 60% above the purchase price. The full cost of concentrates is usually 7% to 15% above the purchase price.

In the case of concentrates there is often less opportunity to produce these on farm. However, Mr Beca pointed out there can still be significant opportunities through astute purchasing decisions. In addition there are often opportunities to reduce the effective cost of concentrates through eliminating potentially excessive use of protein, minerals, trace elements and other additives.

4. Labour efficiency

After feed costs, labour costs are normally the next largest cost centre. In Australian/New Zealand pasture based dairying there are many instances where labour costs (including imputed management costs) are greater than feed costs.

Mr Beca reports that in both Australia and New Zealand the average level of performance is most commonly 90-110 cows per full time staff equivalent, with the top 10% of farms running 110-120 cows. However there is also a significant minority running 140-170 cows per full time equivalent which provides a window into a major opportunity for many farmers to lift profitability. Mr Beca believes the most critical factor in labour efficiency to be the management skills of the business owner or operator.

5. Fixed cost structure

Mr Beca reports that, when the fixed costs are compared on a per cow basis, high profit farms normally have a lower cost structure than other farms even though they will often exhibit a higher level of production.

Pasture based dairying has a high proportion of variable costs in that these variable costs normally constitute 70%-85% of operating

expenses. In a high variable cost business there are not significant opportunities to increase revenue (i.e. milk production) to "water down" the impact of high costs. Effectively businesses with a high proportion of variable costs have no alternative but to control costs if they are to be significantly profitable.

In summary, Mr Beca pointed out that, in Australia and New Zealand, the most profitable farms are those that have pasture harvest levels 15-25% above average, milk production per hectare 15-30% above average, whose supplementary feed costs are 5-20% below average, have increased labour efficiency (measured as cows milked per full time staff equivalent) to 10-30% above average and whose base cost structure per cow is 5-15% below average.

References

Beca D 2005. Key Profit Drivers: Pasture system. Proc. 2005 SA Large Herds Conference, 21-24 February, Club Mykonos, South Africa.

Minson DJ 1990. Forage in Ruminant Nutrition. Academic Press Inc., San Diego, California. pp 228

Mönnig HO & Veldman FJ 1976. Handbook on Stock Diseases. Tafelberg Publishers Limited, Cape Town. pp 236

Roche JR 2005. Managing the transition cow on pasture: a testing time! Proc. 2005 SA Large Herds Conference, 21-24 February, Club Mykonos, South Africa.

Young PW, & Rys G 1977. Proc. Ruakura Farmers' Conf. 29: pp 30-33.

MPO/GSSA DAIRY FARMER SYMPOSIUM

Date: 1 September 2005 · Venue: Boston Farmers Hall

Contact Details
Nicky Findlay
Tel: 033 355 9644
e-mail:
findlayn@dae.kztnl.gov.za

PROGRAMME:

09h30 - 10h00: Tea

10h00 -10h05: Welcome

Contact Details
Joy Caine
Tel: 033 394 3963
Fax: 033 342 7284
e-mail: mpokzn@iafrica.com

10h05 - 10h25: The role of commercial farmers in BEE (Carlos Boldogh, COO, KZN Department of Agriculture)

10h25 -10h50: BEE initiatives in the Eastern Cape dairy industry (Trevor Elliot)

10h50 - 11h05: Discussion

11h05 - 11h20: Break

11h20 - 11h50: Ten years of no-till maize production (Rene Stubbs)

11h50 - 12h10: No-till pasture systems (Beezy Stone and Nigel Smith)

12h10 - 12h25: Discussion

12h25 - 13h05: MPOKZN AGM

13h05 - 14h00: Lunch

After lunch: Static display of new types of pasture pleasers and the results six weeks after planting with each of the machines

SHORT-TERM INFLUENCE OF FIRE IN A SEMI-ARID GRASSLAND ON (1): PRODUCTIVITY

H.A. Snyman
Department of Animal, Wildlife and Grassland Sciences, University of the Free State
E-mail: SnymanHA.Sci@Mail.uovs.ac.za

Introduction

Although fire is a natural phenomenon in the grassland areas of southern Africa (Everson 1999), large parts of the semi-arid grasslands are characterised by large-scale accidental, runaway fires (Snyman 2003a). In these semi-arid areas the density of lightning flashes could be approximately four strikes/km^2/yr (Everson 1999). Even if the frequency of ignition is low (say one fire from 500 ground flashes), a large number of fires would have been ignited each year in semi-arid areas. Either lightning or man caused these unplanned events which normally took place during the dormant winter period (June to August), they not only have a short-term influence on productivity of the grassland ecosystem (Snyman 2003b), but may also have a major residual effect on the next growing season, depending on successive climatic conditions and post-fire management (Zacharias and Danckwerts 1999). This information can serve as guideline in court cases where production losses are claimed, in which thousands of Rands can be involved and often being based on unscientific evidence. The low and unreliable rainfall characterising the semi-arid areas accompanying with unplanned fires also cause enormous fodder flow problems (Snyman 1998). Therefore, it was the objective of this study to estimate the short-term (two years) impact of fire, which is a normal phenomenon in the semi-arid areas, on the productivity (aboveground phytomass and litter) of the grassland ecosystem.

Procedure

The research was conducted in Bloemfontein (28°50'; 26°15'E, altitude 1350m), in the semi-arid (summer annual average 560mm) region of South Africa. At the start of this study the grassland was in good condition (grassland condition score was 92% of that of the benchmark site) and dominated by the climax species *Themeda triandra*, with *Eragrostis chloromelas* and *Elionurus muticus* also occurring relatively abundantly. The soil is a fine sandy loam soil of the Bloemdal Form (Roodepoort family 3200). Clay percentage increases down the profile from 10% in the A-horizon (0 to 300mm depth), to 24% in the B1-horizon (300 to 600mm) and 42% in the B2-horizon (600 to 1200mm depth).

The research was conducted on 6 plots of 3m x 10m each, re-applied every year on a new area, over a seven year period (1995/96 to 2001/02 season). Each plot was monitored only over a two year period. The treatments randomly applied, included burning (head fire) and a control with no burning taking place. The experimental layout was a fully randomized design with three replications for each treatment.

The burning (head fire) treatments were applied each year at the end of August by which time the grass fuel was dry. To limit the fire to every burnt plot, the plants surrounding each plot (edge effect of 2m) were cut short and soaked before burning. The plots were protected from grazing over the trial. Before the burnt and unburnt

treatments were applied the grassland was harvested to a height of 30mm at the end of each growing season. At the end of each growing season, every treatment was harvested to a height of 30mm. This was to enable comparison of growth between burnt treatments and the unburnt plots.

Temperatures reached and duration 10mm under the soil, at ground level, grass canopy height and 1m aboveground level during burning were measured only for the 2001/02 season's burn. These results are fully discussed by Snyman (2003b). Each year's burning took place in the morning with the wind blowing along the plots from a westerly direction. Air temperature (ground level, 220mm and 1m aboveground) and relative humidity were measured immediately prior to burning with a whirling psychrometer. The wind velocity was recorded during the fire with a hand anemometer held at a height of approximately 1.7m. Wind velocities recorded during the fire were assessed to be the most representative for that time of the year.

The mean height of the flames (m) was estimated visually once the fire was burning uniformly. The rates at which the fire moved over the plot were also measured. Basal cover and botanical composition were determined with a bridge-point apparatus, where 500 points (nearest plant and strikes) were recorded per plot before the fire and at the end of the two growing seasons following burning.

Fuel load included the aboveground phytomass as well as the litter just before burning (August). Firstly the litter (dead plant parts separate from grass tufts) was hand-raked in 10 quadrats ($1m^2$ each) randomly placed in control plots, adjacent to the burning plots. After that, in the same plots, the aboveground phytomass production component, comprising the previous seasons production, was measured by cutting the grass to soil level. In the laboratory, the litter was washed under running water over a 2mm sieve to get rid of attached soil particles. Harvested materials were oven-dried at $90^{o}C$ for 72 hours before being weighed. Care was taken that the annual litter collection and production measurements took place in a new area each time by marking it with steel pens.

Seasonal herbage production or regrowth from burnt grassland and control plots were determined by clipping the plants in 10 quadrats ($1m^2$ each) randomly placed to a height of 30mm in each plot at the end of the growing season (April). The relation between aboveground phytomass production loss due to fire, and two independent variables namely, seasonal rainfall and fuel load were examined. Multiple regression analysis was used to analyse the seven years' data. The fuel load before burning and the season's rainfall following the burning were regressed on the seasonal production loss due to burning (seasonal unburnt production minus regrowth of burnt grassland).

Results and discussion

Fire behaviour

The long-term average aboveground phytomass production of the study area is 1692 (range: 2678 to 613)kg/ha/a (1977/78 to 1996/97 growing season: Snyman 1998, and 1995/96 to 1998/99 growing season: Snyman 1999) compared to the 1740kg/ha/a on average for the seven years preceding burning in this study. Therefore, the fuel load approached the long-term loads for the study area.

The average air temperatures over the study period measured at ground level, 220mm and 1m aboveground during the fire were $12.2^{0}C$ ($\pm 1.5^{0}$), $15.4^{0}C$ ($\pm 1.8^{0}$) and $17.3^{0}C$ ($\pm 1.9^{0}$) respectively. The relative humidity varied over the study period between 42 and 49%. The average wind speed over the study period was 3.2 (± 0.6)m/s. The flames of the fire reached an average flame height of 1.1m. The head fires move on average 4.7m/min over the plots. Building the above-mentioned parameters as obtained in this study into the

fire behaviour model of Trollope (1999), the predicted fire intensity should have been 1145k/J/s/m^2. Therefore, the fire intensity was a moderately hot fire.

Basal cover and botanical composition

The head fire caused a decrease ($p \leq 0.01$) in basal cover of 39% over the first season after burning (Figure 1). Two growing seasons following the fire, the basal cover was still 22% less ($p \leq 0.01$) than that of unburnt grassland (Figure 1).

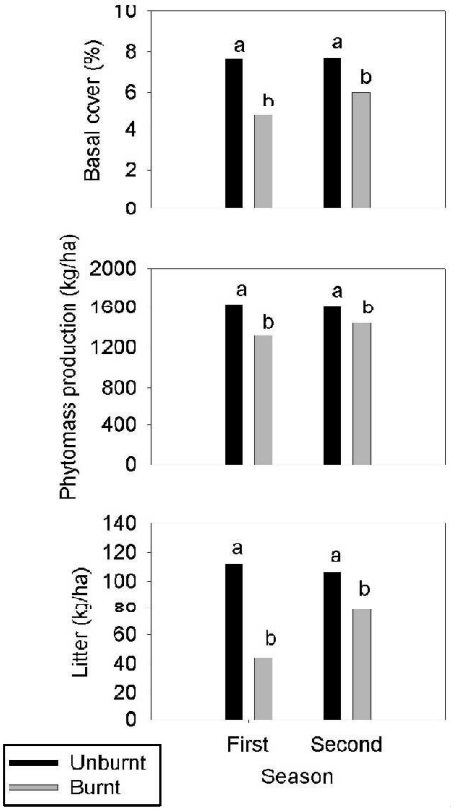


Figure 1: *Average basal cover (%), aboveground phytomass production (kg/ha) and litter production (kg/ha) for the unburnt and burnt (first season and second seasons after burning) grassland over the 1996/97 to 2001/2002 growing seasons. Bars with letters in common within seasons are not significantly different at the 1% level.*

The fire did not influence the botanical composition drastically. The climax grasses like *Cymbopogon plurinodis*, *Elionurus muticus* and *Themeda triandra* were influenced most by fire, with a decrease in species composition of 8, 9 and 13 percentage points respectively. The subclimax *Eragrostis chloromelas* grass increased in species composition after the fire by 4%.

Aboveground phytomass production

The rainfall varied between 319 and 689mm, with three years above the long-term average of 560mm for the study area. The average seasonal production or regrowth of the burnt and unburnt grassland differed significantly ($p \leq 0.01$) from each other for both seasons following the fire (Figure 1). This was also the case for all growing seasons within the study period. Over the first and second seasons following the fire, the burnt grassland produced on average 23% and 12% respectively less over the study period than unburnt grassland (Figure 1). According to most researchers burning clearly reduces yield in the summer immediately following the burn treatment (Everson 1999; Morris and Fynn 2001). In the Tall Grassveld of KwaZulu-Natal, for example, December yields following spring burning averaged only about 40% of those recorded after mowing. By February, however, differences between burnt and mown rangeland had declined to between 10% and 35%, and the next season differences were even less pronounced (Everson 1999). The decrease in production due to fire in this study was still evident ($p \leq 0.01$) after two growing seasons, for all seven studied seasons. Production losses due to fire, which is also a function of seasonal rainfall (between 319mm and 687mm) varied between 225kg/ha and 430kg/ha.

Litter

Fire decreased ($p \leq 0.01$) litter for both

growing seasons following the fire (Figure 1). As expected, an increase in litter occurred in burnt grassland due to the increase in plant cover and production with the onset of the growing seasons following the fire. The litter was still 27% less ($p \leq 0.01$) on average due to the burning treatments, after two growing seasons. Similarly other researchers also found a significant decrease in litter after burning (Blank *et al*. 1994; Snyman 2003a).

The average litterfall from the unburnt grassland of 109kg/ha in this study, is far less than the 750kg/ha from semi-arid *Astrebla pectinata* grassland in Australia (Ingram 2002). As a proportion of annual phytomass production of the unburnt grassland, average litterfall of 6.7% in this study, is less than from other semi-arid rangelands of 16% (*Astrebla pectinata* grassland: Ingram 2002), 11% (*Themeda triandra* grassland: Ingram 2002), 9% (*Eragrostis xerophila* grassland: Ingram 2002). In most arid and semi-arid grasslands, litter turnover is very slow (Whitford *et al*. 1988).

Relation between production loss due to fire, fuel load of unburnt grassland and seasonal rainfall

The significant ($p \leq 0.01$) multiple linear regressions obtained for one and two seasons after the fire, are presented separately in Figure 2. For one and two years after an accidental fire, the production losses can be respectively estimated by 81% and 79% accurately (Figure 2) if the fuel load before burning is determined or known. Figure 2 clearly indicated that the higher the fuel load before burning, the greater the production loss due to fire. Grassland that has been burnt appeared to be inefficient in using higher quantities of water to benefit aboveground phytomass production, whereas unburnt grassland appeared to be more effective in this regard.

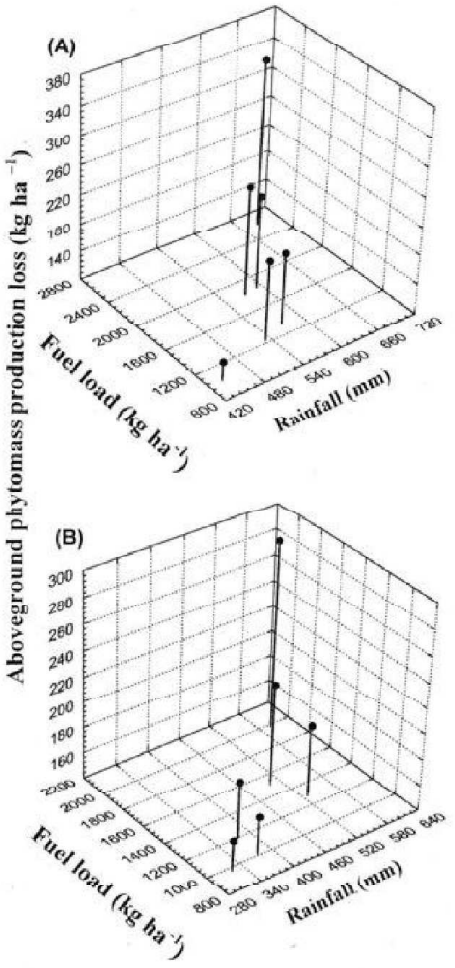


Figure 2: *Relationship between seasonal aboveground phytomass production loss due to burning (kg/ha), seasonal rainfall (mm) and fuel load (kg/ha) without burning (n=6). (A) relation for one year after burning and (B) relation for two years after burning, illustrated as a scatterplot.*

Equations where x_1=seasonal rainfall and x_2 = fuel load without burning, are:

$$A: y = -118.00 + 0.46x_1 + 0.05x_2 \quad (r = 0.90; p \leq 0.01)$$

$$B: y = 49.55\ 0.07x_1 + 0.14x_2 \quad (r = 0.89; p \leq 0.01)$$

The simple linear regressions obtained between aboveground phytomass production loss due to fire, with seasonal rainfall, and aboveground phytomass production without fire (fuel load), is presented in Table 1 for the first and second season after burning.

Table 1: *Relationships between aboveground phytomass production loss due to fire (y), with seasonal rainfall or fuel load before burning, for two growing seasons after burning (n=6). **1% level of significance and *5% level of significance.*

	Equations			
Seasons after burning	**Seasonal rainfall (mm)**	**r**	**Fuel load (kg/ha)**	**r**
First	y=0.80x - 226.89	0.95**	y=0.11x+46.39	0.98**
Second	y=0.36x + 40.65	0.87*	y=0.12x + 42.53	0.99**

The high correlation (r = 0.95 average for the two seasons) between seasonal rainfall and fuel load indicated that production increases with higher rainfall, in turn leading to an increase in production loss due to fire.

Conclusions

The study clearly pointed out the negative impact of fire on the basal cover, which was still lower than that of unburnt grassland after two growing seasons. The decrease in plant cover and litter exposed the soil surface to assault by the natural elements and must be considered in management programmes.

It was clear from the results that the decrease in production due to fire in semi-arid grasslands could still be evident after two growing seasons following the fire. Production losses due to fire, which is also a function of the amount and distribution of the rainfall, can vary between 225kg/ha and 430kg/ha. The necessary knowledge of the influence of fires on productivity is important for adjusting stocking rates and ensuring sustainable utilisation of the grassland ecosystem. Although the findings in this study are based on only seven years of observations, these significant relations between production loss due to fire, rainfall and fuel load can therefore serve as a simple empirical model for managers in obtaining short-term production loss due to fire. This information can also serve as scientific guidelines in estimating production claims for damages in case of negligent grassland fires.

If the burnt grassland in this study has also been grazed, the decrease in production may be much higher with a longer recovery period. Fire can seldom be isolated from its association with grazing and therefore further in depth research on grazing management following burning is important for the stability and sustainable utilization of semi-arid grasslands.

References

Blank RR, Leah A and Young JA 1994. Soil heating, nitrogen, cheatgrass and seedbed microsites. Journal of Range Management 47**:** 33-37.

Everson CS 1999. Veld burning in different vegetation types. In: Tainton NM (ed.). Veld management in South Africa. University of Natal Press, Pietermaritzburg, South Africa, 472 pp.

Ingram LJ 2002. Growth, nutrient cycling and grazing of three perennial tussock grasses in the Pilbara region of NW Australia. PhD thesis, University of Western Australia, 280 pp.

Morris C and Fynn R 2001. The Ukulinga long-term grassland trials: reaping the fruits of meticulous, patient research. Bulletin Grassland Society of Southern Africa 11(1): 7-22.

Snyman HA 1998. Dynamics and sustainable utilization of the rangeland ecosystem in arid and semi-arid climates of southern Africa. Journal of Arid Environments 39: 645-666.

Snyman HA 1999. Quantification of the soil-water balance under different veld condition classes in a semi-arid climate. African Journal of Range & Forage Science 6 (2 & 3): 108-117.

Snyman HA 2003a. Short-term response in productivity following an unplanned fire in a semi-arid rangeland of South Africa. Journal of Arid Environments 56:465-485.

Snyman, HA 2003b. Fire and the dynamics of semi-arid grassland: influence on plant survival, productivity and water-use efficiency. African Journal of Range and Forage Science 20(1): 29-39.

Trollope WSW 1999. Fire behaviour. In: Tainton NM (ed.). Veld management in South Africa. University of Natal Press, Pietermaritzburg, South Africa, 472 pp.

Whitford WG, Stinnett J and Anderson J 1988. De-composition of roots in a Chihuahuan desert ecosystem. Oecologia 75: 8-11.

Zacharias PJK and Danckwerts JE 1999. Management of humid grasslands after burning in southern Africa. In: Proceedings VI International Rangeland Congress, Townsville, Australia 1: 527-528.

OPINIONS

G'day Alan

Am not sure if this is what you want but it is worth a try to see if I can start some sort of discussion forum? So here goes...

Cheers

Eugene Moll

I have been in the plant ecological field for several decades and my interests have been many and varied. As I come to the end of my active research life I am focussing down and am most interested in two topics/problems:

1. Management of small nature reserves, particularly those that are fragments of once much larger ecosystems. There are particular difficulties with managing such areas, and I would like to correspond to others who have a similar interest - and with those who have some experience managing such areas. My observations are that such reserves, once set aside, are then NOT MANAGED adequately.

Let me give one example of some Strandveld vegetation (now called Sub-Tropical Thicket) near Melkbosch Strand just north of Cape Town (in the modern era almost contiguous with the greater UniCity). From 1982 to 1992 I took my third year population and community plant ecology students to this area annually in February for them to collect structural/functional data of the higher plants. In those times the structure of the vegetation consisted of some 50-60% canopy cover of short thicket (average height about 1m) of evergreen (with some deciduous) shrubs, some spinecscence, mainly of a sub-tropical origin but with many Cape endemic species (examples are *Olea exasperata* and *Euclea racemosa*, others being *Rhus* spp., *Maytenus heterophylla*, *Putterlickia pyracantha*, *Cussonia thrysiflora*, etc.). In the gaps between the thicket clumps there were with sandy "pathways" that had some perennial dwarf succulents and in spring were filled with annuals and geophytes.

When I went to Melkbosch in 2004 I observed that the thicket patches had mostly closed over, and that the interstitial spaces were no longer being "maintained" for the succlents, the geophytes and the annuals. This change has occurred as the area is no longer extensively/intensively grazed/browsed by sheep, and certainly no longer patch-burned.

When I look at other reserves in my local area I note that --

The Renosterveld on Signal Hill (now Table Mountain National Park) and in the Tygerberg Nature Reserve is not being properly managed,

The Strandveld in the Cape Flats Nature Reserve has grown in height and density, as well as the fact that the gaps between the thicket patches have closed over,

The Fynbos above the Kirstenbosch Botanical Gardens was last burned in about 1970 and today is rapidly becoming Afromontane Forest, and there are other areas like Rondebosch Common that are nutrient sinks (dog and human poo enriched, plus aerial nitrogen from pollution, etc.), such that the nutrient status is no longer low and suitable for some Cape species (many local endemics, or at least species that have suffered tremendous range contraction in the modern era), but more suitable for others (mainly Mediterranean grasses),

And there are other areas that are all well "conserved", BUT the vegetation structure and composition is changing alarmingly rapidly in my assessment (and without base-line studies who really knows? But then I have some observations but not adequate qualitative data). Maybe this is a good thing? HOWEVER, I submit that such areas are too difficult to manage for a variety of reasons, and are simply protected (in some cases fenced off) and left to "manage" themselves!

This "management" does not meet the requirements of biodiversity conservation and there is an urgent need to remedy what is a very complex problem.

I am sure that there are similar problem areas in and adjacent to all metropols?

2. Fire as a management tool in the SW Cape, and the way in which modern human perceptions are influencing the application of fire management programmes. Thus I am not interested in the ecology of fire *per se*, but the way in which fire is perceived as a management tool. What I have observed over the last 40+ years is that modern humans are more and more dislocated from nature, and as such are starting to apply human morality and ethics to other species in ecosystems. Thus we are effectively interfering with natural processes, which now have an overwhelming socio-political dimension that is of great concern to me as the impacts over time (and I am not even talking of evolutionary time here) are becoming significant (and to me extremely worrying).

I guess this goes to the point of whether modern humans are interfering too much in a number of major management issues (elephant culling and the actions of PETA come to mind here too as examples that are current, even the so-called canned lion debate could be considered part of this!). We perceive a need in the modern era to consult all role players, assuming that all role players understand ecological principles and therefore management imperatives of fragmented ecosystems. Thus we are trapped in a modern paradigm that can be viewed as anti-nature and I am putting it that strongly to invoke a response!

But let me stay with fire, and fire management of ecosystems that are contiguous to urban areas. There are enough issues to debate without too many red-herrings around elephants, lions and certainly PETA!

ANY THOUGHTS? Contact the editor at alan.short@dae.kzntl.gov.za

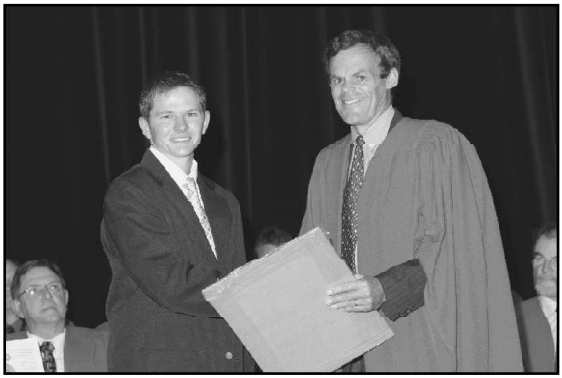
Awards

The GSSA award for outstanding academic achievement was handed over to **Heath Cronjé** at an impromptu award ceremony in February 2005. His dissertation was entitled 'Rangeland management implications of a scale-related vegetation survey in the Arid Lowveld, South Africa.' and he will be receive his Master of Technology degree in Nature Conservation in the May 2005 graduation ceremony at Tshwane University of Technology. He examined the use of scale-related vegetation mapping and classification with regard to management units on Andover Game Reserve, near Orpen in the Limpopo province.

From left to right: *Mr Mike Panagos, Mr Heath Cronjé and Prof Itumaleng Selala.*

Mr Ockert Einkamerer received the GSSA award for outstanding academic achievement, from Prof. Hennie Snyman for the best B.Sc.Agric. final year student in Grassland Science with best continuous performance during all the years of study with an average of at least 70%. He is currently enrolled as a B.Sc. Honours' student at the University of the Free State.
Southern Africa medal from Prof. Hennie Snyman for the best B.Sc.Agric. final year student in Grassland Science with best continuous performance during all the years of study with an average of at least 70%. He is currently enrolled as a B.Sc. Honours' student at the University of the Free State.

From left to right:
Mr Ockert Einkamerer and Prof. Hennie Snyman



Dave Richardson received the GSSA award for outstanding academic achievement for his work on modelling rangeland systems.

*****

PhD Citation

Prof. Timm Hoffman, Leslie Hill Institute for Plant Conservation, Botany Department, University of Cape Town
e-mail: thoffman@botzoo.uct.ac.za

Thesis Title: Simulation models of rangeland production systems: simple and complex

Francis David Richardson BSc (Agric) (Nottingham), PhD (London)

David Richardson was born in Ealing, England, in 1929. He graduated BSc (Agric) from the University of Nottingham in 1952, and was awarded a PhD by the University of London in 1978 for research in isolating factors influencing the productivity of beef cows and their calves in marginal rainfall areas. During his career as an agricultural scientist in Zimbabwe he served as an extension officer, lecturer and researcher.

In 1984 he was appointed Professor and Head of Animal Production at the then University of Bophutatswana, where he served in various capacities including Dean. Since 1990 he has been an Honorary Research Associate in the Department of Mathematics and Applied Mathematics at the University of Cape Town.

Today's award is a fitting culmination of David Richardson's life work of increasing understanding of African rangeland and pastoral production systems and of the quantitative interactions between rainfall, soils, vegetation, livestock and the aims of pastoralists. In the thesis he develops a comprehensive mechanistic model which simulates in the short term (one year) the effects of rainfall, stocking rate and range condition on the productivity of forage and livestock in the Succulent Karoo of Namaqualand. He also shows how this short-term model may be used to model ecosystems in the much longer term (one hundred years). The value of David Richardson's work is aptly summarized in the words of one of his examiners: "This work will no doubt stand as a foundation on which much further insight into the dynamics of African rangeland ecosystems is built the demonstration of a range of dynamical effects leading to the conclusion that the system exhibits 'complex' rather than equilibrium or disequilibrium dynamics is excellent and, when published, will stand as a significant contribution to the search for a unified theory of grazing system dynamics."
Supervisor: Associate Professor B.D. Hahn (Mathematics and Applied Mathematics)
Co-supervisor: Professor S.J. Schoeman (Animal Sciences, University of Stellenbosch)

From left to right*: Prof. Daya Reddy, Dean of Science, Dr Dave Richardson, Prof Christopher Gilmour, HOD of Maths and Dr Nicky Allsopp, President of the GSSA.*

GSSA Congress 40 REGISTRATION FORM

Please fax the following information to the contact numbers below.

Title:		Initials:		Surname:	
Name for name tag:				Institution:	
Address:					
City:		Postal Code:		Country:	
Tel:		Fax:		Cell:	
E-mail:					
Do you intend presenting?	Yes	No	Platform? (tick)		Poster? (tick)
Day delegates: which days do you expect to attend?	Tues		Wed		Thurs
Which evenings do you expect to attend (for catering purposes)?	Mon		Tues		Thurs
Preliminary title(s):					

Contact

Richard Hurt
email:info@mindmap.co.za
Tel:(033) 345-3146
Fax:(033) 394-6687
Cell:(082) 887-1082

Freyni du Toit
email: admin@gssa.co.za
Tel: 033 390-3113
Fax: 033 390-3113
Cell: 083 256-7202

BUSH ENCROACHMENT IN THE LIMPOPO PROVINCE - GSSA TOUR

by Alan Short
alan.short@dae.kzntl.gov.za

When some GSSA colleagues from the Limpopo Province announced that they were planning to host a bushveld tour in their backyard, focussing on bush encroachment dynamics, those of us from KwaZulu-Natal jumped at the opportunity to head north. Chris Dannhauser, Jorrie Jordaan and Robbie Robinson put together a programme that promised to be interesting and informative, and proved to be so throughout the four-day tour.

At Bela-Bela, the home of the Towoomba Agricultural Research station, we were welcomed by the organisers and met the other participants in the tour. Other than the KZN party, most of the participants were from the northern part of the country. The entire group added up to seventeen people or so, which was a perfect size to make new friends and have some stimulating discussion. Despite many people having travelled for several hours, the participants showed their enthusiasm by engaging in some vigorous debate from the very first presentations in the afternoon.

The Towoomba station is the home of the Irvine grazing trials. These were named after Dr. Irvine, who established them in the 1930s, and they have been running continuously ever since. These trials were designed to test the effects of various grazing systems at the same long-term stocking rate on the Sourish Mixed Bushveld (Acocks 1988). The trial consists of four unreplicated grazing treatments, with one continuously grazed treatment and three variations on rotational grazing, which includes the following: A two-camp system, one camp grazed in winter and the other during spring, summer and autumn. A two-camp system, one camp grazed from late winter to late summer and the other from late summer to late winter. A three-camp system, one camp grazed during spring, one during summer and one during winter and autumn.

Jorrie Jordaan has recently completed his PhD on the vegetation dynamics on the Irvine trials over 70 years, and some fascinating patterns were revealed. Several of the treatments were grazed continuously during the relatively short summer growing season, and these showed the greatest increases in woody plant density. However, there were a number of confounding factors, including the slightly different soil types on the continuously grazed treatment (which showed the most dramatic increase in woody plants), and the fact that the other treatments were effectively grazed at a much higher stocking rate during the critical four-month growing season.

Hennie van der Berg discussed how remote sensing using satellite imagery could be used as a tool to monitor and evaluate changes in bush density, using some fascinating imagery from the Limpopo Province to illustrate his talk.

The beers and braai in the evening allowed us to relax and get to know each other informally. That first night set the tone for the rest of the trip. There were many late-night discussions over the next four days as we solved the problems of the world around a braai or a swimming pool.

The next morning was taken up by a number of presentations, and discussion that took us well into the planned timetable. Anuschka Barac demonstrated EcoRestore, a decision-support software package developed at North-West University. The package allows

land-users to choose the most effective bush control methods by comparing their conditions to those in a database of various bush control sites in the arid regions of South Africa and Namibia.

Finally, we were taken to see the trials which had sparked all of the debate. The differences in vegetation composition and structure between the various camps are stark and undeniable.

We headed north that afternoon to the Lapalala wilderness. Lapalala was established by the collaboration of the well-known environmentalist Clive Walker and a businessman and fellow nature enthusiast, Dale Parker. The reserve is situated in the stunning Waterberg mountains, and is a sour, sandy savanna (Mixed Bushveld and Sour Bushveld; Acocks 1988) stocked with a variety of game. The Parker family have created a vision of a large protected area where people, especially disadvantaged children, could experience the magic of wilderness and learn about the wonders of the nature on their doorstep. The reserve is about 36 000 ha, and has a major bush encroachment problem in parts. The managers showed us the various bush-clearing and thinning programmes they have in place, some of which have been more effective than others. The management have been entertaining the possibility of introducing elephants, both to increase the marketability of the reserve, and to help thin the woodlands out.

The following morning we headed north again, past Alldays, and stopped at Pontdrif, on the border between South Africa and Botswana. There we clambered about in the dry Limpopo riverbed like a bunch of schoolkids. It was a remarkable experience to be able to stroll across the border between two countries without the authorities so much as batting an eyelid.

The contrast between the relatively moist bushveld in the south of the Limpopo Province and the arid veld types in the north is striking, and something that many of the KZN contingent had not experienced. After Lapalala we had travelled through Mixed Bushveld and Arid Sweet Bushveld, and found ourselves on the border of South Africa in the Mopani Veld. Magnificent baobabs stood tall above a sea of mopani scrub, with rocky koppies breaking the otherwise featureless horizon. This is game farming country, and everywhere we went we found ourselves surrounded by twelve-foot game fences. Cattle were rare enough to be cause for comment.

We stopped for lunch at the 8000ha Messina Experimental Station near Musina. Prof. Dirk Wessels described the work that he and his colleagues are doing on ameliorating the tannins in mopani leaves. Mopani is virtually the only forage available in the mopani veld, but animal production can be depressed at certain times of the year by the high concentrations of tannins in the leaves. The experimental farm has been concentrating on game research for some years, since game production is the major industry in the region. This is something that the KwaZulu-Natal Department of Agriculture should be bearing in mind, particularly in the north of the province, as huge areas are being converted from livestock production to game production.

The Messina Experimental Station is also home to a magnificent granite inselberg (Matakwe), said to be one of the largest free standing rocks in the world. From there, we had a spectacular view of the world, with the flat landscape of the Limpopo valley stretching out on all sides. We could see Zimbabwe to the north, and what seemed like most of South Africa to the south. Leopards are still known to reside in the tiny bush clumps that miraculously cling to valleys in the rock's surface.

Our last night was spent at another hot springs resort, Tshipise, just south of Musina. Some mistake in our accommodation arrangements saw to it that most of us had to choose between sharing a double bed with our room mate, or sleeping on the floor. By this time, we'd all come to know each other well, so everyone took it in good humour. There were plenty of cracks that night about revealing the secret sides of our natures to our better halves.

The next morning, Arnaud le Roux of the Endangered Wildlife Trust's Poison Working Group chatted about the work his organisation is doing to protect the endangered oxpeckers. Oxpeckers have diminished or disappeared across most of their former range thanks to the widespread use of dips to control tick-borne diseases on livestock. The Poison Working Group provides advice to managers on the responsible use of poisons in the environment. In the case of oxpeckers, a comprehensive manual for farmers has been produced, on how and when to use poisons, and which poisons may be safely (and legally) used to control ectoparasites (Verdoon & Marais 2004).

At Tshipise, the KZN contingent parted company from the rest of the tour group. Graham Peddie had arranged for us to see the Kruger Park's long-term burning trials, so we headed due west, to the Pafuri Gate. Some of the KZN workers had never had an opportunity to visit a "big five" nature reserve before, and it was their first experience of seeing elephants and other animals in the wild. We stopped off at Crook's Corner, on the border of Mozambique, Zimbabwe and South Africa, to admire the view. Significantly, the Limpopo River was still bone-dry, the most telling sign of the drought in Limpopo Province that we had yet seen.

The KwaZulu-Natal group's last night together was spent at the beautiful Mopane camp, in the northern half of the park. The Mopane camp is one of the newer camps in the park, and the atmosphere is quite different from the manicured lawns with scattered huts of the more traditional camps. Although the camp is fenced, the bush has been left largely intact, so that braaing outside our huts, we felt as though we were deep in the African bush.

Those of us who still had a long way to go left early the next morning. Graham and some of our colleagues were shown around the replicate of the Kruger long-term burning trials near Mopane by Nevashny Govender, a Fire Ecologist at Kruger. The trials were established in the 1954, replicated at four locations spread throughout the park, and consist of a variety of burning seasons and frequencies in roughly 7ha plots (Enslin *et al.* 2000).

Graham Peddie, before we parted company with the tour group at Tshipise, summed up everyone's feelings about the week in a heartfelt thanks to Chris, Jorrie and the others who had worked so hard to put together the package. Despite the small size of the group, there was a range of interests and experience, and it was a great opportunity for all of us to interact on a stimulating professional and personal level with colleagues from opposite ends of the rainfall gradient. To put it more simply, we made new friends and learnt a lot.

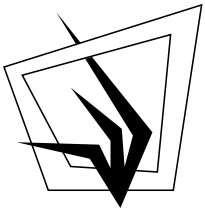
Acknowledgements
To all those who gave so generously of their time to make this tour so successful and interesting, our sincere thanks.

References

Acocks JPH 1988. Veld types of South Africa. Memoirs of the Botanical Survey of South Africa, No. 57. Government Printer, Pretoria.

Enslin BW, Potgieter ALF, Biggs HC & Biggs R 2000. Long term effects of fire frequency and season on the woody vegetation dynamics of the *Sclerocarya birrea/Acacia nigrescens* savanna of the Kruger National Park. Koedoe 43(1): 27-37.

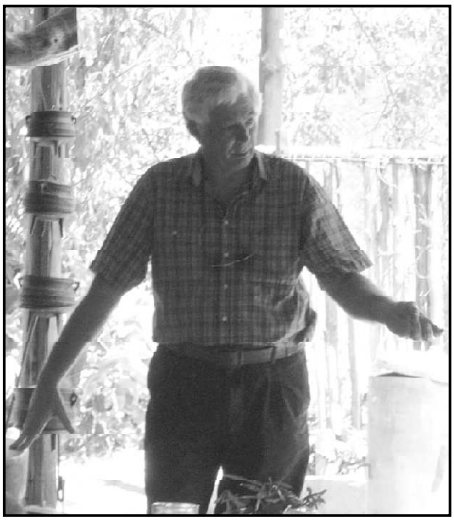
Verdoon GH & Marais EW 2004. Ecologically sound management of ectoparasites and oxpeckers. Extoparasiticide-oxpecker compatibility chart. Endangered Wildlife Trust PoisWorking Group, Private Bag X11, Parkview 2122.



The GSSA bushveld tour participants at Alldays.

Back row: *Chris Dannhauser, Caiphus Khumalo, Cobus Botha, Thulani Nzuza, Arnaud le Roux, Jorrie Jordaan, Brent Forbes, Hennie van der Berg, Parvin Shaker.*
Second row: *Mynhardt Sadie, Graham Peddie, Felicity Fryer, Doreen Ndlovu, Erika van Zyl, Anuschka Barak, William Diko.*
Front: *Alan Short*

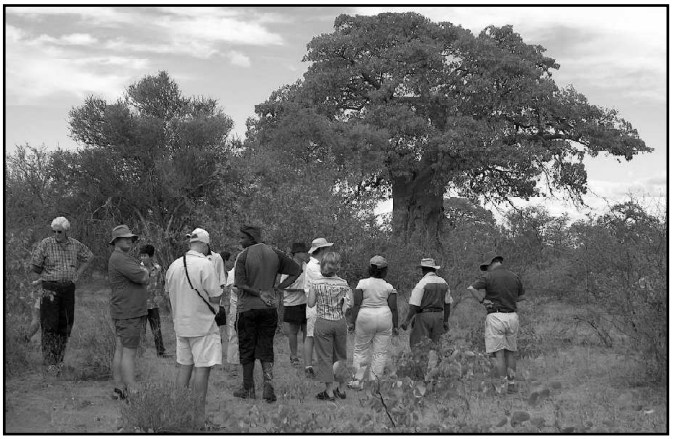
Photo courtesy Erika van Zyl



Left:
Prof. Dirk Wessels of the University of Limpopo discusses the work on Mopane as a forage at Messina Experimental Station

Right:
Bush control efforts at Lapalala Wilderness in the Waterberg. The area in the foreground was cleared and sprayed with herbicide, while the area in the background was not cleared.

Above: *Serious conversation at Tsipise Spa.*



Left:
Thick mopane scrub at Messina Experimental Station

Right:
Stepping in some big footprints in the Limpopo River: Erika and Anuschka at Pontdrif. (Photos courtesy Anuschka Barak)