grass roots

Newsletter of the Grassland Society of Southern Africa

Incorporating the Bulletin of the Grassland Society of Southern Africa
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Rehabilitating rangelands—technology and challenges

A grazing management decision support system for farmers

Practical considerations for developing African pastoralism

What causes woody plants to increase in savannas?

Milk production from mixed kikuyu-clover-ryegrass pastures

Advancing rangeland ecology and pasture management in Africa

Editorial

Dear Readers

The GSSA has always tried to play a greater role in society than simply being a forum for grassland scientists to interact. Our discipline - or rather, our disciplines - are not glamorous. I'm sure many of you have experienced the difficulty of trying to explain your job to distant family at weddings.

Nonetheless, we do have an important role to play in agriculture, in biodiversity conservation, in resource conservation. Rangelands cover most of Africa's land surface, and millions of people rely on the products and services generated by functioning rangeland systems.

The GSSA can make a contribution by helping to spread the knowledge contained within our membership. For example, the GSSA has registered as an interested and affected party for the Environmental Impact Assessment process for the construction of the new multi-products pipeline between Durban and Johannesburg. The GSSA also hosted a successful rehabilitation symposium in Pietermaritzburg which brought together researchers, practitioners and consultants in the field of rangeland rehabilitation.

All of us can contribute by using the GSSA as a platform to arrange similar events, or by using the GSSA website, Congress, the Journal and the *Grassroots* to disseminate information to the public.

Alan Short

The Grassland Society of Southern Africa is dedicated to the advancement of the science and practice of range ecology and pasture management.

We welcome any contributions to the Grassroots*, in the form of news, informative articles, reports, short research notes, scientific papers and letters to the Editor. Email alan.short@dae.kzntl.gov.za or admin@grassland.org.za or fax +27 (0)86 622 75 76*

Layout and design:
Alan Short

Printed by:
CPW
49 Langalibalele St
Pietermaritzburg
cpwart@telkomsa.net

Contents

Features

Regulars

On the cover: Degraded veld in the Herschel District of the Eastern Cape. What solutions are available to pastoralists (p. 27) and how do we rehabilitate veld (p. 38)? Photo: Wiseman Goqwana.

Send your photographs to the Editor

P.O. Box 41 ● Hilton ● Pietermaritzburg ● 3245 ● South Africa
Tel: +27 (33) 390 3113 ● Fax: +27 (0)86 622 75 76 ● Cell: 083 256 7202
Email: admin@grassland.org.za ● http://www.grassland.org.za

News

Introduction to Veldcare

Craig Morris of the Agricultural Research Council and Donavan Kotze of the University of KwaZulu-Natal have produced the first in a new series of books aimed at small-scale farmers, called *Introduction to Veldcare*. The book illustrates the basic principles of veld management in clear, understandable terms and with the aid of illustrations. The books are available in English or Zulu, and are available on the GSSA website or from Craig Morris. Contact him at morris@ukzn.ac.za

GSSA Annual Report published

As a newly-registered non-profit organisation, the GSSA is now required by law to produce an annual report detailing the activities of the Society.

Loraine van den Berg, the Society Secretary, has produced a professional annual report for the 2006/07 financial year, which is accessible to any members who wish to see how their membership fees are spent. Simply visit the GSSA website or contact the Administrator.

GSSA Trust application forms

The application forms for GSSA Trust funding are available to members on the GSSA website. The GSSA Trust was established for the purpose of "furthering the aims of the GSSA", and funding is available to members who suitably motivate their application, for a variety of purposes, such as attending conferences and workshops.

Limited funding is available, and applications will be decided on a first-come, first served basis, subject to approval with conditions by the Joint Allocations Committee.

Upload your publications to the website

The website has a new facility for members of the GSSA and the broader range and forage science community: members can now share their publications on the website, or provide links to their publications on other academic websites.

Send in your thesis, reports, journal articles or abstracts, or any other relevant outputs that you would like to have available to the wider world.

Several members have already done so. Note that the Society cannot assume responsibility for dealing with copyright issues; it is up to members to determine whether their publications can be made freely available on the website.

Journal submissions

Email your submissions to the African Journal of Range and Forage Science to journal@grassland.org.za

GSSA listed as interested and affected party for new multi-products pipeline

The GSSA has been listed as an interested and affected party (IAAP) for the Environmental Impact Assessment (EIA) of the new multi-products pipeline from Durban to Johannesburg.

The new pipeline is commissioned by Transnet and will transport various petroleum products from the refineries in Durban to reservoirs in Gauteng The existing pipeline was built in the 1960s, and can no longer cope with the demand for fuel. The demand for fuel will grow exponentially over the next few decades and the new pipeline will have to have sufficient capacity to cope with current and projected future demand.

The GSSA was represented at a meeting between non-governmental organisations and the environmental consultants performing the EIA, in Howick near Pietermaritzburg on 12 February 2008, by Justin and Freyni du Toit and Alan Short.

The consultants presented the proposals for the possible alternative routes that the pipeline could take, and explained how the developer was intending to engage with every landowner along the route in order to ensure appropriate compensation for landowners.

The major issues that the GSSA will be concerned with are the damage to the environment caused by the construction of the pipeline, and the rehabilitation process after construction is complete. The GSSA will follow this issue closely, and we will keep members informed of developments.

Documents can be accessed at www.zitholele.co.za/currentprojectseianmpp

Mining now under environmental law

Mining will now be subject to the same environmental legislation as other developments, the Cape Argus reported on the 12 March.

Environmentalists have long been concerned that mining was exempt from environmental regulations.

Interim measures will be put in place until the legislation is changed to allow the Department of Environmental Affairs and Tourism to take over the Environmental Impact Assessment process for mining entirely.

Until then, the EIA process will be jointly administered by the Departments of Minerals and Energy and of Environment, but the final appeal authority will be the Minster of Environmental Affairs.

The legislative changes should take place by June, according to the Cape Argus.

Bursaries

Post Doctoral Research Fellows Fire Ecology and Communal Range Management

Department of Livestock and Pasture Sciences, University of Fort Hare, to work within the project "Communal Range Management (CRM)", funded by Govan Mbeki Research Development Centre of the University of Fort Hare and W.F. Kellogg Foundation (Deadline for applications: 30 June 2008). Starting salary is R100,000.00 p.a. For more information contact the Project Leader: Dr. Sikhalazo Dube, email: sdube@ufh.ac.za. Application should be via email to the Project Leader stating suitability for the job; accompanied by a comprehensive CV and 3 traceable referees. The closing date is 30 June 2008.

MSc: Problems related to tree recruitment and bush encroachment in the coastal zone of KwaZulu-Natal, South Africa

School of Biological and Conservation Sciences, University of KwaZulu-Natal, Pietermaritzburg Campus, South Africa.

This will be part of an international project funded by the Shell Foundation in The Netherlands, comparing savannas in each of the continents. This will involve a lot of experimental fieldwork in a remote part of KwaZulu-Natal, and a greenhouse study based in Pietermaritzburg. Specifically, we will address the following questions related to the issues of recruitment of young trees:

1. Do tree seedlings respond differently to resources in savannas around the world? If so, are there community-level differences that reflect consistent underlying plant traits related to environment of origin (Rainfall X Soil type), or to continent of origin?
2. Do tree seedlings differ in their ability to compete with grasses for different resources?
3. Do tree seedlings differ in their ability to tolerate defoliation?

This will result in at least one joint, worldwide publication comparing savanna recruitment across the world and a number of publications specific to KwaZulu-Natal's humid zone.

All qualified applicants will be considered. A bursary will be R40,000 per annum, part of which will be obtained from a National Research Foundation bursary (R30,000) and the remainder (R10,000) from research funds. All research costs will be covered by the Shell Foundation. Full-time students only.

Please contact:
Prof David Ward
School of Biological and Conservation Sciences
University of KwaZulu-Natal
Scottsville 3209
E-mail: ward@ukzn.ac.za
Fax: 033-260 5105

Movers and Shakers

Have you recently moved jobs, or been promoted, transferred, fired or imprisoned, or emigrated? Let us know in our new regular column.

As we don't have time to edit your letters, *Grassroots* recommends that you keep your comments about your previous boss to your mates in the pub.

Brian Dalton:
I have been appointed as an Environmental Specialist at Rio Tinto within the Safety, Health, Environment, and Quality (SHEQ) department of the Palabora Mining Company (PMC). My area of responsibility covers primarily environmental compliance with the relevant legislation, Rio Tinto Standards, and PMC policies whilst providing specialist Grassland Science input into specific projects related to copper mining and eventual mine closure. The mine is a declared nature reserve which opens into the Kruger National Park which makes for an exciting and challenging environment to work in. Small town, great people, challenging job…loving it!!!

Frits van Oudtshoorn:
I recently resigned from the Limpopo Department of Agriculture, as Pasture Scientist, to work for a new slave driver (but with much less hassle!), myself. We (the slave driver and I) started a consultancy company named "Bushveld Environmental Consultants" at the end of 2007. We are doing mainly Game Farm Management Plans and Ecological Reports for EIA's in Southern and East Africa. To sound more prestigious (and because I could), I have changed my job title to "Rangeland Ecologist". We can be contacted at bushveldec@lantic.net.

Khanyisile Mbatha:
I have been appointed as a senior lecturer of the University of Zululand, Department of Agriculture as from the beginning of 2008.

Dr Adrian M Shrader
In February, I took up a lecturer position (Wildlife Conservation and Management) in the School of Biological and Conservation Sciences at the University of KwaZulu-Natal, Pietermaritzburg. Having spent the past six years doing postdocs at the University of Pretoria and the Nelson Mandela Metropolitan University, I figured it was about time to get a 'real' job. I've joined what was the old Grassland Science Department and will be continuing my research on the ecology of large herbivores, as well as teaching Advanced Rangeland Ecology and Behavioural Ecology.

Upcoming events

From www.grassland.org.za

World Environment Day
Kick the Habit! Towards a Low Carbon Economy
Date: 5 June 2008
Venue: Global
Contact: Rajinder Sian
Email: worldenvironmentday@unep.org
Website: http://www.unep.org/

Groundwater and Climate in Africa - an international conference
Date: 24 - 28 June 2008
Venue: Kampala, Uganda
Contact: Alice Aureli
Email: a.aureli@unesco.org
Website: www.gwclim.org/

Organisation and Management in the Seed Sector Training Programme
Date: 23 June - 4 July 2008
Venue: Berlin, Germany
Contact: Dr. Walter Haege
Email: walter.haege@gmx.net

Adaptive Collaborative Management Course
Date: 23 June - 5 July 2008
Venue: Bloemfontein
Email: nico.rozemeijer@wur.nl

43rd Annual Congress of the GSSA
Date: 21-25 July 2008
Venue: Aventura Badplaas, Mpumalanga, South Africa
Tel: +27 (0)33 390 3113
Contact: Freyni du Toit
Email: admin@grassland.org.za
Website: www.grassland.org.za/annual-congress/2008

Joint Forum- AZEF and FF
Date: 3-7 August 2008
Venue: Oudtshoorn, South Africa
Further information will be made available soon

Annual Thicket Forum Conference
Preserving Thicket's Heritage Today for Tomorrow.
Date: 20 - 22 August 2008
Venue: Goldfields Education Centre, Grahamstown
Contact: Bronwyn Palmer
Tel: 084 813 2431
Email: bron.palm@gmail.com

SAWMA Conference 2008
Date: 16 - 18 September 2008
Venue: Mpekweni Beach Resort, Eastern Cape
Contact: Elma Marais
Tel: 021 554 1297
Email: elma@mweb.co.za
Website: www.sawma.co.za

New World: Future World
The 10th World Conference on Animal Production;
Date: 23-28 November 2008
Venue: Cape Town International Convention Centre, South Africa
Tel: +27 12 420 3276 or +27 12 420 3290
Contact: Deidre
Email: deidre@iafrica.com
Website: www.wcap2008.co.za

Council News

The Council met from 25 – 28 March for a very exciting Strategic Planning session. After a challenging debate around the purpose of the Society a new mission statement was formulated. The Strategic Objectives of the Society were also revised and refined to fit in with the current context of the GSSA (see article about Strategic Planning session on p. 10).

The preliminary program for Congress 43 was presented and included ample opportunity for scientists, practitioners and farmers from various fields to contribute. Please note that only three Post-Congress tours are being organized, so don't wait too long before signing up. Remember to submit your abstracts and visit the website for updates and further information!

The website continues to elicit positive responses from both members and the general public. However, it remains essential that the content is continuously updated and added to, so please don't hesitate to send new information, updates, job opportunities and upcoming events to Khanyi Mbatha or Freyni du Toit.

It was decided that a special Strategic Planning session for the Journal would be beneficial to clarify issues surrounding the operation of the Journal, low submission rates and other matters. This meeting will take place before Congress and members will be informed about the outcome.

Council is currently looking at a new cost structure for membership, where members essentially choose and pay only for the components (e.g. Journal, Grassroots) they want. A final draft of this structure will be presented at AGM.

Trust would like to remind members that funding is available for attendance of conferences and other special projects. Application forms are available from Freyni du Toit.

Council would like to remind all members involved at tertiary institutions to please send in nominations for GSSA student awards.

Congratulations to Justin du Toit, who organized a very successful and informative GSSA rehabilitation day. Members are invited to contact Council if they would like to organize similar events.

Hope to see you all at Congress!

Döhne Grassland Scientists visit KwaZulu-Natal

Pieter Conradie
Eastern Cape Department of Agriculture
Email: pw_conradie@yahoo.com

True to tradition, pasture scientists and technicians from Dohne embarked on an end of year tour during the first week of November 2007. While the main purpose of the tour was to gain knowledge of veld and vegetation types not familiar to the Eastern Cape, it is also a great opportunity to meet with pasture scientists from other provinces and share ideas. Not to forget the opportunity it offers to socialize and do some team building.

The first stop was at Tsolo Agricultural College (Eastern Cape) at a legume cultivar trial. Conducted in partnership with the Centre for Rhizobium Studies at Murdock University, Australia, 29 legumes species and cultivars from all over the world are assessed for adaptability to be used for increased production on old lands.

The next morning Alan Short and William Diko showed us around the Kokstad Research Station. This is a real 'hidden' treasure and apart from the most interesting research being carried out, the scenery is exceptional. Of particular interest was the much documented stocking rate trial laid out by Mark Hardy in the eighties, which also includes


Photo: Pieter Conradie

Döhne grasslands scientists comparing the effects of sheep and cattle grazing on the long-term trials at Kokstad research Station

monitoring of soil loss on the different treatments. The demonstration value of the cattle to sheep ration trial is clear and no farmer will be able to argue the point after visiting the station.

Our visit to the University of KZN (a first for most of the tour group) gave insight into the research activities at this renowned pasture research institute and allowed opportunities for prospective students to meet with Kevin Kirkman and Justin du Toit. At Ukulinga, the university research farm, we saw the response of veld to fire and cutting. This trial was laid out more than 50 years ago by J.D. Scott and is still being maintained together with a trial from the same era, involving fertilizing of natural veld. After visiting these sites there can be no doubt in anybody's mind as to the extreme value of long term pasture trials. Returning to the present, Kevin and Justin showed us some of the advanced technology being developed in the field of restoration ecology.

The last leg of the tour was to the majestic southern Drakensberg. This included a drive up Sani Pass, which matched our challenging excursion through the Baviaanskloof during the previous pasture tour. These challenges are an essential part of any tour as some of the tour members like to put their 4X4's to the test! Due to rainy conditions we did not see much of the flora of the Drakensberg, but having had Gluhwine and Irish Coffee in the highest pub in Africa made it all worth while.

Membership changes

Resignations

Fiachra Kearney (CSIRO Sustainable Ecosystems, Australia)
Gavin Brockett
Gert Coetzer
Johan Labuschagne (Western Cape Department of Agriculture)
Neil Baxter

New Members

HOTGROUP (Gert Meintjies)
Lerotholi Qhobela (SADC Plant Genetic Resources Centre, Zambia)
Martha Konje (MSc Student, Rhodes University)

Mr Abraham Landman (left) and Ms Käte Booysen (right) received the GSSA award for outstanding academic achievement from Prof. Hennie Snyman, at the graduation ceremony of the University of the Free State. This award was for best BSc. final year students in Grassland Science with best continuous performance during all the years of study with an average of at least 70%. Their average marks for 8 Grassland Science subjects differed by only 0.2% and it was therefore decided to award both of them the prize.

They are currently enrolled as BSc. Honours students at the University of the Free State.

Defining a future direction for the GSSA

GSSA Strategic Planning meeting 26 - 27 March 2008, Kenosis Retreat, Pietermaritzburg

Alan Short and Loraine van den Berg
Grassland Society of Southern Africa
Email: Alan.Short@dae.kzntl.gov.za

Introduction

Over the last few years the GSSA had made major efforts to become more professional in its approach to managing and growing the Society. In the modern world, the Society is competing for members' time and resources with a great many other priorities. Like any business, the GSSA needs to be guided by a clear vision and measurable goals. In order for the GSSA to remain relevant to its members and true to its core values, the Society embarked on a strategic planning process ten years ago. At the end of March 2008, the Council and several Society veterans met again to revisit the strategic objectives of the Society and measure the achievement, or relevance, of those objectives decided four years ago.

The workshop was facilitated by Harry Biggs of SANParks, himself a Society veteran and a veteran of many high-powered strategic planning exercises in various organisations. His experience and humour kept the workshop focussed over two exhausting but rewarding days of intense discussion and debate.

Previous strategic objectives

Justin du Toit presented the results of a preparatory survey that had been conducted among Council members and several experienced Society members, on the achievement of the original strategic objectives decided four years ago. The 14 strategic objectives could be broadly divided into three categories according to how well they had been accomplished over the past few years.

The objectives that had been accomplished well related to the Congress, which has attracted enthusiastic participation for several years from a wide range of organisations, the administration of the Society (more about that later), and some technical and legal issues

dealing with the publisher of the Journal and the Constitution. Importantly, the strategic plan developed in 2004 had been used to guide the Society's activities and was extremely effective in focussing the resources and efforts of Council.

Several strategic objectives fell into the "mediocre" accomplishment category, according to members. Although some key role players had been informed about the GSSA, many more institutions and senior managers had yet to be exposed to the Society. ISI rating has still not been achieved for the Journal, despite constant communication between the Society and the journal's publisher, NISC (who have the responsibility of seeking ISI rating). An advertising strategy for *Grassroots* and the website has been developed, but until recently very little actual advertising space was sold. Finally, the portfolios of some additional members on Council still needed to be clarified.

Over the past four decades, society has changed and the GSSA has changed too

Four strategic objectives were considered to have been poorly addressed. With a few exceptions, the Society had not really achieved its aim of translating scientific information into layman's terms in popular media. The Society had generally failed to expose itself in the media, particularly radio and TV, again with one or two exceptions. The role and functioning of the Professional Affairs Committee was still uncertain. Finally, the GSSA had made little progress in developing strong partnerships with other organisations.

The members debated the relevance of many of the previous strategic objectives, and several people were concerned that the strategic objectives did not really address the core function of the Society. However, it was also pointed out that at the time of the original strategic planning workshop, the Society was in dire financial straits, and the reason many of the objectives did not seem so important now was because the Society had grown over the past few years, and had moved beyond the original objectives. The original objectives needed redefining, as did the vision and mission of the GSSA.

Redefining the Vision, Mission and core values of the GSSA

The original vision and mission generated some heated debate about the role of the Society in society. The membership of the GSSA covers a broad range of disciplines, and the vision and mission of the Society need to be broad enough to reflect this diversity. The GSSA is primarily a forum for exchange of ideas in the broad disciplines of rangeland and pasture science, but also plays an active role in the disci-

plines associated with grassland science.

The GSSA was founded 40 years ago with a very strong agricultural focus and strong government representation. Over the past four decades, society has changed and the GSSA has changed too: now the Society reflects a much broader range of interests such as biodiversity, carbon sequestration and climate change, in addition to the traditional agricultural sectors. The traditional sources of research funding and the direction of research conducted by members has changed, with government research institutions such as departments of Agriculture playing a smaller role in grassland science research than previously. Socio-economic issues have become increasingly prominent in members' work. The membership profile of the Society has changed dramatically, in terms of age, gender and race, over the past two decades.

Core values

The GSSA embraces a number of unwritten core values, which have guided its philosophy for decades. Collegiality is extremely important – members are part of a broader, like-minded and open social network. The GSSA is primarily a forum for promoting and disseminating original scientific research, with a strong focus on resource conservation. The Society promotes diversity and recognises and encourages young scientists. The broad membership

The vision and mission of the Grassland Society of Southern Africa

Vision

Advancing rangeland ecology and pasture management in Africa.

Mission

We provide a dynamic and inclusive forum and publish quality research.

Through embracing diversity and change, we seek to promote:

- Science into practice
- Human capacity development
- Trans-disciplinary views

and support the understanding of ecosystem services to achieve production, conservation and biodiversity goals.

of the GSSA can mean conflicting values placed on resources (for example, planted pastures *versus* biodiversity conservation); the Society must be broad-minded enough to recognise and embrace diverse opinions. The GSSA places a high value on applied science with strong links to land users and practitioners, and leading practitioners are recognised and rewarded. There is a strong belief in cooperation rather than competition between institutions and individuals.

Diversity is the GSSA's greatest strength, but also its greatest challenge.

Unique and special attributes

The following were mentioned as unique and special attributes of the GSSA:

- The membership profile is very diverse. The membership is youthful, but the Society has also lost a lot of experience;
- The GSSA is very transdisciplinary;
- Both agriculture and biodiversity conservation are strongly represented;
- There is healthy interaction between scientists, practitioners, policy makers and stakeholders;
- The Society boasts a strong knowledge base in many disciplines;
- The GSSA runs very successful Congresses which are social and congenial;
- The GSSA has excellent administrative support with good communication systems which have allowed the Society to grow;
- There is a high level of trust within Council (social capital);
- Lots of members who are enthusiastic, willing and loyal;
- Long-term and continuous collegiality;
- The GSSA publications.

All of the above attributes support the vision and mission. Although several "soft" attributes were identified (such as collegiality), they contribute to the success of the Society.

Determinants and constraints

The workshop spent some time identifying the determinants of the above special attributes, as well as constraints and threats.

Running successful Congresses and symposia is largely due to the enthusiasm of members, who have been encouraged to run their own sessions (rather than relying on the congress organizing committee to decide the entire programme). Excellent keynote speakers, both local and international, have contributed to events. Congresses are professionally run, with good venues and excellent post-congress tours and side events in-

volving the broader community outside the GSSA. Importantly, the Society has good financial back-up from GSSA Trust.

Threats to Congress include the perception that Congress is too general, and there is a perception that Congress is too expensive, particularly for practitioners in the private sector.

Freyni du Toit, the administrator, was mentioned by name as making a huge contribution to the success of the Society through her professional, business-minded administration of the GSSA. The "back-office" functions of the Society have been significantly improved and streamlined through her technological aptitude, particularly the development of the Society's database (which handles everything from Congress fees to requesting contributions for *Grassroots*), and the new Society website. The Society is sufficiently financially viable to pay for professional administration services.

A potential threat is complacency on the part of Council – loss of key people could have a severe impact on the administration of the Society.

Other determinants of the success of the Society included the congenial atmosphere of Society events, the relatively small discipline and, interestingly, the fact that there is not a lot of money in the discipline – the Society is not run by "fat cats". Members are loyal to the Society, which contributes to the sharing of experience between old and new members. The GSSA is a nursery for new scientists, and young scientists are welcomed and included in GSSA events, rather than patronized. Some threats to these attributes include, again, complacency: the Society cannot afford to take these special attributes for granted lest they slowly become corrupted. The diversity of the Society also holds the potential for ideological rifts within the Society – a lesson learned from bitter experience in the mid-1990s, when a clash between some members nearly caused the GSSA to split.

Future directions

The next phase of the workshop focused on identifying the key areas for action, and strategies to guide the direction of the Society for the next few years.

The most important activities of the Society were identified as:

- Running successful meetings, especially Congresses;
- Publishing good quality research in the African Journal of Range and Forage Science;
- Revitalising the planted pastures component of the GSSA;
- Clarifying the role of the Professional Affairs Committee (PAC);
- Increasing capacity development, particularly the development of young scientists;
- Maintaining the important "soft stuff" – the social attributes mentioned above as key to the Society's institutional culture;
- Growing the *Grassroots*;
- Maintaining professional administration.

Within each of these focus ar-

eas, specific ingredients for success were developed, which in turn were used to generate tasks for Council members to perform. The full report is available to members on the GSSA website.

A major area of concern which will require a lot of additional work is the state of Journal, particularly improving the number and quality of submissions. The Journal is arguably the most important product of the Society, with a long and proud history of publishing excellent peer-reviewed research. Key to the Journal's success is marketing it, through the publishers, as a peer-reviewed journal catering to an important niche market relevant to Africa. A number of strategies and tasks to this end were identified, which will be pursued by the Journal Editor.

The GSSA is a nursery for new scientists, and young scientists are welcomed rather than patronized

Conclusion

The most important feature of the workshop was its success in identifying the core values and functions of the GSSA, which in turn will focus the activities of Council in ensuring the continued relevance of the Society. The GSSA is an organisation that has an important role to play in society, in nurturing young scientists and providing a platform for specialists in to interact in many fields related to range and pasture science. While there is a great deal of overlap between the interests of the GSSA and many other organisations, no other single organisation contains the diversity of disciplines that is embraced by the GSSA. This diversity is the GSSA's greatest strength, but also its greatest challenge. Council's challenge will be to ensure that the GSSA remains relevant and that the GSSA's core values continue to guide the Society.

Participants

The following people participated in the discussions, and their contribution is gratefully acknowledged: Rina Grant, Harry Biggs, Kevin Kirkman, Jorrie Jordaan, Peter Scogings, Susu Vetter, Luthando Dziba, Mark Hardy, Klaus Kellner, Richard Hurt, Pieter Conradie, Khanyisile Mbatha, Alan Short, Loraine van den Berg, Justin du Toit, Freyni du Toit, Pete Zacharias and Dave Goodenough. Phillip Botha and Leslie Brown sent written contributions. Thanks also to the members who commented on the achievement of the previous strategic objectives.

Grazing management by a computer model

Dr G.A. Jacobs
KwaZulu-Natal Department of Agriculture and Environmental Affairs
Email: jacobsd@dunrs.KZNTL.gov.za
Tel. 082-920-0851

A new spreadsheet model was developed in order to assist farmers and extension advisors make informed decisions about carrying capacity, stocking densities and fodder availability on a seasonal basis, based on assumptions about the relationship between rainfall, veld condition and fodder production on the one hand, and animal requirements on the other. The computer programme ensures that the correct carrying capacity is maintained. Only rainfall need be updated by the farmer. The factors that contribute to determine the grazing days of a group of animals in a camp, in practice, were listed and the size of each contribution was quantified.

Herman Fouche and W.J. van den Berg presented a new application of the PUTU model of veld production at a workshop in Pietermaritzburg (Morris 2006). Their new application did not always give accurate enough advice for general implementation (personal communication, Fouche 2006).

The following six contributing factors towards carrying capacity were used in the current model.

1. Rainfall

Rainfall normally is the main driver of pasture production. It has the tremendous benefit that previous rainfall predicts future pasture production. This is a powerful tool to prevent poor planning which will result in under- or overgrazing, which is the main grazing problem currently to be addressed in this country. From communal to privately own grazing land, all can benefit from this management system.

In the past effective rainfall was assumed to be 80% of mean annual precipitation in KwaZulu-Natal (Smith, 1998, p21). This model does better than that because it uses the real effective rain that actually occurred during the months of that particular growing season. In KwaZulu-Natal the Bioresource Programme, which is available free of charge to all farmers via specialist extension officers, shows the expected monthly rainfall for each month of the year for all locations and this data source can be used if

no local records are available. When the actual rainfall differs from the expected, the grazing days (carrying capacity) in each camp will change and the new dates for camp changes are then shown in the model.

Pasture production changes may vary from 0 to 100% due to rainfall changes.

2. Season

Veld production changes vary from 0 to 100% due to season, with no production during the dormant winter period and with 100% production during the rainy season.

3. Length of the summer resting period

The contribution of resting period varies from 0 to 100%, because with no rest there will be no veld production after a camp was burnt. Without any period of recovery, to allow for new re-growth, there will be nothing to graze. It is clear that the grass available for grazing increases in relationship to the length of the resting period after a burn or after the end of a grazing period.

4. Previous year's rainfall

The previous rainy season's total rainfall contributes to the level of the underground water. A maximum change of -8 to 17% in the growing season and -5 to 11% in the dormant season are the current settings for the sourveld regions of KwaZulu-Natal, for a previous year's rainfall of 40 to 200% of mean annual rainfall. These settings are suggestions that are not based on literature and may thus be changed as necessary. The main idea now is to show that there is room for such changes.

5. Automatic adjustment of veld condition on a particular farm

This adjustment is regarded as automatic, because even though the model starts on a farm with a guess of the overall production status of the veld, which can be a figure of between 0.01 and about 5 (kg dry matter/mm effective rainfall/ha), it is self adjusting to the real value. This procedure is based on the assumption that veld condition determines the production potential of the veld per millimetre rainfall – very poor condition veld will have a production potential of less than 1 kg/mm/ha, while veld in excellent condition will produce 5 kg/mm/ha or more.

The animals that graze the first camp, after this package is launched on a farm, determine the size of the veld production figure to be used. The initial veld production figure guess could thus be any value, the accuracy of which will be improved by monitoring the animals in the first camp of the rotation. The production value estimate that is initially entered, combined with the rainfall on the farm and the area of each camp, determine the number of animal unit (AU) grazing days in each camp. Say the first camp was completely grazed after 21 days of grazing by a certain group of animals, but the programme predicted 28 days, then the veld production

figure of say 3.5 in the programme needs be adjusted downwards, until it predicts 21 days as well. This can be regarded as a once off "veld assessment done by the grazing animals" in the first camp after launching, for the farm as a whole.

Pasture production changes may vary from 0 to 100% due to changes in this veld production factor.

It is interesting to note that this veld production figure (of say 3.5) shows the total kilograms dry matter produced by the veld per millimetre of effective rainfall per ha. This veld production figure is influenced by infestation of the veld with inedible intruder plants, current state of soil erosion, soil depth, fertility and clay percentage, basal cover and grass species. Thus this is why we say this figure might be between 0.01 and *about* five, because it may sometimes be possible to exceed 5 kg dry matter per mm of effective rainfall.

6. Automatic adjustment of veld condition in each camp of that farm

In the same way the animal's "veld assessment" in the first grazed camp is done for the farm as a whole, the adjustment for fine tuning carrying capacity in each camp is done in the same way but only this time a carrying capacity adjuster in each camp is used. This individual camp production adjuster effectively adds or subtracts from the production factor for the farm as a whole.

Explanation of spreadsheet setup

The programme consists of three spreadsheets which are linked to each other. The first spreadsheet has room for recording the daily rainfall; the second calculates the theoretical area of land that is fully grazed daily per large animal unit (AU); and the third contains the names of all the camps on the farm, with one worksheet per camp up to a maximum of 21 camps. Where there is more than one farm with the same rainfall, or a farm with a large number of camps, there will be another "third" spreadsheet added for each farm.

Every year, after printing all data, the rainfall recorded in the first spreadsheet must be blocked and deleted. After this deletion, the expected median rain for each month must be copied to the first day of each month as an indication of average future rainfall expectation. As the season progresses this expected median rain is replaced with the actual rainfall of the new rainy season.

To facilitate weekly changes in carrying capacity predictions, for each month divide the future expected rainfall into four and insert these four weekly expected precipitations at days 1, 7, 14 and 21.

Actions to be taken by the farmer

After launching this programme on a farm by a scientist, the farmer needs simply to record the rain and move the animals from one camp to another by following programme instructions as indicated at the bottom of each camp.

Setup work by advisor

The advisor will change the dummy camp names to match that of the farmer's, and will update each camp's size in ha and change the name of the dummy farm to that of the farmer's. The scientist will train the client where and how he can insert weekly future rainfall expectations.

Working of the programme

In the third spreadsheet the camp names are seen at the bottom of the screen as worksheet pages. One worksheet contains a summary of all camps and has the name "Summary and Totals".

At any time all three spreadsheets need simultaneously to be copied and simultaneously be pasted to a directory of your choice, for example "Grazing management of Skietfontein farm 2007 2008 season" as a backup.

Every year at 30th June make a copy of all programmes and recorded rainfall data. Then change future expected rainfall to the median expectations.

All movement of animals to new camps must be updated in the model. Rest periods, grazing days and even the season (growing season or dormant period) are automatically calculated and indicated.

The model displays the following information automatically:

1. Number of days in a camp.
2. Number of days that a camp has rested.
3. For the actual number and size of animals in that camp: Number of grazing days left before it will be fully grazed.
4. Date when the camp will be fully grazed. This date will change after every rainfall update and will change weekly when the expected rain for that week is deleted because of no rainfall during that week. The date when animals must be moved from the camp will increase with above average rainfall and will decrease with below average rainfall.
5. Automatic warnings one week beforehand to change camps to prevent animals from going hungry
6. Grazing days already grazed and remaining for each camp and a summary for the whole farm.
7. Length of time that any number of animals can stay in any camp, when herd sizes are planned. More and bigger animals will finish the camp sooner.

Other features of the programme:

1. It indicates when to sell livestock, not to exceed the real carrying capacity of a farm at that time. A one page fodder flow analysis is an optional part of the programme.
2. The total numbers of all types of animals on the farm are included in calculations.
3. Value of all types of animals on the farm.
4. Allows planning to change herd sizes to comply with optimal resting periods. The optimal resting period for kikuyu was found to be 28 days (Cruywagen *et al.* 2007). A rest period for veld is necessary,

as frequent and severe defoliation during the growing season results in a decline in vigour (Crider, 1955, cited by Tainton, 1988).

5. Distinguishes automatically between growing season's and dormant period's carrying capacity.
6. Automatic accumulation of history which includes large animal grazing days in each camp and on the farm.

The programme has been tested practically in collaboration with several farmers, as well as in consultation with colleagues, and has proved to be a useful decision support tool for livestock farmers.

Typical size of all three spreadsheets is 800 to 900 Kb, and the programme available from the author.

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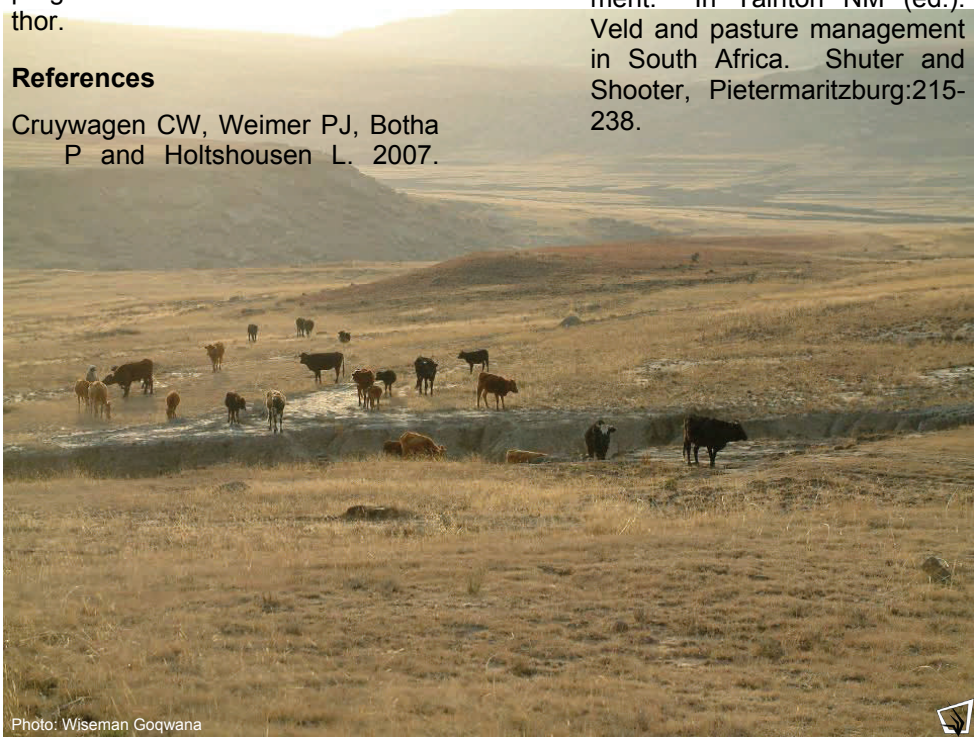

Photo: Wiseman Goqwana

Increase of woody plants in savannah ecosystems

Vhalinavho P. Khavhagali and William J. Bond
University of Cape Town
Email: vkhavhagali@half.ncape.gov.za

Although savannas cover a large part of the world's land surface, there is still limited understanding about what determines the structure and distribution of savannas. Savannas are broadly defined as tropical seasonal ecosystems with a continuous grass layer, mixed with forbs and sedges with a variable cover of trees and shrubs. Savannas occur in seasonal climates with a distinct dry and wet season, and they are important socio-economically in tropical regions (Scholes and Archer 1997).

An increase in woody plant density has been reported as a problem in grassland and savanna ecosystems, because increased woody cover can result in decreased herbaceous production and diversity. Trees, shrubs and thicket species invade open grasslands through a process well known as bush encroachment, and thicken up in already wooded areas to form woodlands through a process known as "woody plant encroachment" (Trollope 1980). Woody plant encroachment has occurred in many parts of the world, including Africa (Sankaran *et al.* 2005).

Conversion of savanna woodlands to forest/thicket stands will be referred to as forest colonization. Forest colonization is a process whereby forest/thicket species colonize savannas to form a closed woody stand. At times, grasslands and savannas are replaced by scrub thicket and eventually closed forest (Bond *et al.* 2005). Forests are defined as ecosystems with large trees and overlapping tree layers. Forests and other woody formations differ from savannas in lacking a continuous grass cover (Bond *et al.* 2005). Invasion of forest species in savannas causes a complete replacement of savanna biome to a forest/thicket formations, bringing about a biome shift. Trapnell (1959) and Archer *et al.* (1988) reported the natural succession, invasion of forest species in sa-

vanna environment resulting in the formation of forest/thicket stands. Replacement of savannas by forests is a phenomenon apparently restricted to mesic areas (>650 mm rainfall) (Swaine *et al.* 1992, Bond *et al.* 2003a) and seems to be occurring in many such areas in South Africa (Hoffmann and O'Connor 1999, Bond *et al.* 2003b) and Australia (Bowman *et al.* 2001) over the last half century.

The increase in forest coverage and biome shift from savanna to forest ecosystems varies remarkably. It is much more difficult and costly to reverse the process of forest invasion than to control changes in abundance of savanna trees or shrubs. An ecosystem switch from savanna to forest brings about changes in species composition, with grasses shading out, an increase in fire intolerant species and a total biome shift. Several studies have proposed a variety of contributing factors, including climate change, increase in atmospheric CO_2 concentration, fire regimes, grazing by livestock and wild herbivores, canopy cover, and soil resources as factors influencing woody plant encroachment (Knoop and Walker 1985, Bond and van Wilgen 1996, Higgins *et al.* 2000, Bond *et al.* 2003a, Ludwig *et al.* 2004, Bond *et al.* 2005, Sankaran *et al.* 2005, Govender *et al.* 2006). However, it is not well known whether these same factors that influence woody encroachment are responsible for forest colonization.

Forest and thicket patches are common, if small in extent, in most savanna landscapes. Determinants of forest/savanna boundaries have long been debated with some arguing strongly for soil and climate limitations, others for fire, and rarely, an interaction between fire and site conditions in determining forest distribution (Bond *et al.* (2003a) for South Africa). Bond *et al.* (2003a) have argued that most of the higher rainfall eastern grasslands and savannas of South Africa have the climate potential to support forests. They suggest that most grassy biomes with >750 mm mean annual precipitation (MAP) in this region would switch to forest in the long absence of fire.

It has been implied that forest seedling recruitment takes place beneath canopies of savanna trees because they increase resource availability beneath their canopies (Belsky *et al.* 1989). For example, *Acacia tortilis* and *Adansonia digitata* have been shown to increase herbaceous productivity, lower soil temperatures and increase soil fertility beneath their canopies (Belsky *et al.* 1989). Grasses influence woody plant recruitment indirectly by promoting a distinct fire regime with very frequent fires. However they also have direct effects on woody plants by competition for resources, especially in the establishment phase when saplings are shaded by grasses and roots have to compete with grass roots.

Several researchers reported that recruitment of forest species into savannas is limited by soil nutrients (Kellman 1979), frequent fires (Bond *et al.* 2005), and drought or seasonal water logging (Knoop and Walker 1985). Establishment of for-

est species in savannas may also be limited by high light intensity and high temperatures characteristic of the savanna environment (Hoffmann 2000). As a result, the establishment and growth of forest species may be low in open savannas, and may be facilitated by the presence of adult savannas trees (Kellman 1979). Increase in woody encroachment and forest invasion is attributed to fire exclusion (Swaine *et al.* 1992, Bond *et al.* 2005), fire-herbivory interactions (Eckhardt *et al.* 2000), facilitation by large savanna trees (Kellman 1979, Belsky *et al.*1989, Ludwig *et al.* 2004), atmospheric CO_2 and climate change (Bond *et al.* 2003b, Sankaran *et al.* 2005).

Savanna trees ameliorate soil moisture deficits and reduce nutrient stress for establishing seedlings by increasing soil fertility under their canopies (Belsky *et al.* 1989, Ludwig *et al.* 2004) resulting in the formation of "fertile islands". Bond *et al.* (2003a) and Bond *et al.* (2005) suggested that fire is the main factor maintaining mesic savannas because the climate can potentially support closed forests. Fire suppression can trigger rapid forest invasion or increase tree cover by favoring woody seedling establishment or allowing existing saplings to escape the flame zone and grow into adult trees (Higgins *et al.* 2000, Bond *et al.* 2005). High rainfall indirectly restricts forest invasion because it enables grass fuel to accumulate to support frequent fires (Higgins *et al.* 2000) that burn down tree seedlings and coppice growth.

Frequent increase of woody plants in grasslands and savanna, and forest invasion/colonization is taking place in high rainfall areas in South Africa. Open grasslands are transformed to open savannas which thicken up to savanna woodlands and/or switch from woodlands to forest/thicket through a process called forest invasion. Not only an increase in woody plants, but also a change in species composition and a reduction in grasses so that frequent fires and herbivory can no longer be supported, all result in the formation of forest clumps. This is a serious conservation and rangeland problem with the biome switch resulting in reducing conservation values of savanna parks and livestock potential.

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The evaluation of kikuyu over-sown with ryegrass and clover in terms of milk production

P.R. Botha[1], R. Meeske[1]*, and H.A. Snyman[2]

[1]Department of Agriculture Western Cape, Outeniqua Experimental Farm

[2]Department of Animal, Wildlife and Grassland Sciences, University of the Free State

*Email: robinm@elsenburg.com

Introduction

Kikuyu (*Pennisetum clandestinum*) comprises the greater part of irrigated summer and autumn pasturage for milk production in the Southern Cape. Milk production per cow is limited by low forage quality. The aim of the study was to determine the milk production from kikuyu (K), kikuyu oversown with annual ryegrass (*Lolium multiflorum* spp. cv Energa) (KR), kikuyu oversown with a mixture of perennial ryegrass (*Lolium perenne* cv Yatsyn, Dobson) and perennial white clover (*Trifolium repens* cv Haifa, Waverley) and red clover (*Trifolium pratense* cv Kenland, Cherokee) (KRC) and kikuyu over-sown with a mixture of perennial white and red clover (KC). The trial was carried out under irrigation using Jersey cows in a put-and-take grazing system. Fertiliser was applied to raise phosphorus level to 35 mg/kg, potash level to 80 mg/kg and the pH (KCL) to 5,5. No nitrogen was applied to the KC and KRC pastures.

Materials and methods

The study was done on 9 ha kikuyu pasture divided in seven blocks. Each block was divided in three experimental paddocks and pasture treatments were randomly allocated to paddocks. Cows strip grazed four days on each paddock resulting in a 28 day grazing cycle. The K pasture was fertilized at a rate of 420 kg N/ha in seven applications of 60 kg N/ha and the KR pasture at a rate of 600 kg N/ha in ten applications of 60 kg N/ha. Dry matter production, growth rate and grazing capacity were determined. Thirty-six mid-lactation cows were randomly allocated to three different pasture treatments (12 cows per treatment) at the start of spring, summer, autumn and winter. The groups were balanced for milk production (four weeks prior to experimental period), days in milk and lactation number. The number of cows per paddock was adjusted daily to ensure a forage availability of 10kg DM/cow/day. Cows were fed 4 kg of dairy concentrate per day during milkings. Cows were milked twice daily.

Milk production and number of cows on each paddock was recorded daily. Milk composition was determined monthly.

Results

The results are presented on a yearly basis in Table 1. The KR carried more cows/ha than KC during the three years of the study. During year 1, milk production per cow was higher ($P < 0.05$) on KC than on KR and K pasture. Milk production per ha did not differ ($P > 0.05$) between KR and KC during its first year of growth in year 1 and 2 of the study.

Conclusions

The Kikuyu/clover supported higher milk production per cow than Kikuyu/ryegrass and K during the first year. During year two of the study, milk production per hectare of KC and KR was higher than that of KC in its second year of growth. The over-sowing of kikuyu with clover and/or ryegrass increased milk production per cow and milk production per hectare. Milk produced per hectare was very high on KR and KC pasture. Carrying capacity was higher on KR pasture than on KC and KRC pasture.

Table 1 The carrying capacity (cows/ha), average milk production per cow , milk production per hectare and of kikuyu (K), kikuyu over-sown with annual ryegrass (KR), kikuyu over-sown with a mixture of perennial ryegrass and perennial white and red clover (KRC) and kikuyu over-sown with a mixture of perennial white and red clover (KC)

Year	Parameter	**KC** first year of growth	**KR**	**K**
1	Cows/ha	5.27^{de}	8.03^{b}	6.72^{c}
	Kg milk/cow/day	15.7^{b}	14.0^{c}	13.8^{c}
	Kg milk/ha	25940^{bcd}	25953^{bcd}	21377^{d}
		KC second year of growth	**KC** first year of growth	**KR**
2	Cows/ha	5.37^{de}	5.78^{d}	9.03^{a}
	Kg milk/cow/day	16.8^{ab}	17.4^{a}	17.0^{ab}
	Kg milk/ha	22761^{cd}	34615^{a}	38406^{a}
		KR	**KC** second year of growth	***KRC***
3	Cows/ha	6.76^{c}	5.77^{d}	4.80^{e}
	Kg milk/cow/day	16.8^{ab}	17.2^{a}	18.1^{a}
	Kg milk/ha	27109^{bc}	24148^{cd}	29298^{b}

Managing and developing African pastoralism

Some practical considerations

R.J. Sweet
Freelance consultant
Email: jimsweet@hermanus.co.za

Characteristics of pastoralism

There are varying definitions of pastoralism. Some favour a loose definition such as "The use of extensive grazing in rangelands for livestock production" (e.g. Blench, 2001) in order to encompass all forms of extensive livestock production, including fenced ranching. However, such a definition misses a crucial characteristic of what is more commonly understood (especially by social anthropologists) to be pastoralism, and that is that it is practised on unenclosed land of communal ownership or usufruct. It also misses the point that it is the primary economic activity of those who practise it. Hence, I propose the following, tighter, definition: "*Pastoralism is the utilisation, as a livelihood, of communally owned natural pastures (rangeland) for livestock production*." There is a gradation form pure pastoralism, in which no crops are grown, to agro-pastoralism, in which crop production makes a significant contribution to the household economy.

This leads into a definition of "rangeland" since "range" is a word of American origin used to denote extensive areas of natural vegetation suitable for supporting livestock or wildlife, but which has no direct equivalent in English. In South Africa the corresponding word is "veld". Rangeland can be defined as "Land carrying natural or semi-natural vegetation which provides a habitat suitable for wild or domestic ungulates and which is usually characterised by soils that are too poor, and/or rainfall that is too low or erratic, to support permanent cultivation" (Pratt and Gwynne, 1977).

These two definitions help us understand some important characteristics of pastoralism:

- Practised almost exclusively in marginal areas (poor soils and/or low rainfall; high temporal and spatial variability of rainfall);
- Droughts are a recurrent phenomenon;

- Mobility essential to track grazing and water, hence pastoralists tend to be either transhumant (move seasonally between regular wet and dry season grazing areas, and usually have a permanent or semi-permanent base in the dry season grazing area) or nomadic (move continuously, with no home base). Nomadic pastoralism is decreasing due to restricted mobility and government attempts at sedenterisation;
- Pastoralism is a livelihood, not a supplementary activity (although richer pastoralists may develop businesses such as shops);
- Crop production is insignificant and opportunist (may take advantage of good rainfall). Even agro-pastoralists tend to be opportunist in the amount of land they cultivate;
- Security issues are common (e.g. Somalia, Sudan, northern Kenya).
- Tends to be subsistence rather than commercially oriented;
- Under pressure from expanding cultivation (dryland and irrigated, subsistence and commercial) and blocked access to water points;
- The grazing areas are communally owned (only the croplands are normally considered to be individually owned);
- Most pastoralist societies traditionally have well structured social and territorial organisation for controlling grazing and water resources and livestock movements;
- May be based on one predominant species e.g. sheep or cattle, but commonly entails some mixture of cattle, sheep, goats and/or camels. The choice is influenced by climate, vegetation type, water availability and tradition;
- Reasons for livestock ownership are more diverse than in commercial production;
- The rangelands are often shared with wildlife.

An important factor often missed by aid and extension workers is that both range condition and range degradation should be defined in context of the objectives of the production system

Some of the consequences of these characteristics are as follows:

- Livestock productivity is relatively low (milk yields, growth rates, conception rates, birth rates etc);
- Mortality rates can be high (due to drought, disease, predation, conflicts etc);
- Crop yields tend to be low (agro-pastoralists);
- Returns on investment are low (pastoralists don't necessarily sell more livestock; crops don't respond to fertiliser without adequate rainfall);
- Pastoralists and marginal areas tend to be regarded by their governments as low priorities for in-


Photo: Wiseman Goqwana

vestment;
- Increasingly, pastoralists and marginal areas are being seen by development agencies as low priorities for investment (low Internal Rates of Return, long time frames needed);
- Pastoralists tend to be remote from schools, clinics, shops etc;
- Levels of literacy and numeracy tend to be low (although increasing);
- Pastoralist tribes tend to have low levels of political representation;
- Working in pastoralist areas can be difficult (remoteness, movements, security issues);
- Management changes take a long time to show quantifiable results (confounding effects of seasonal variations) compared to crops;
- Lack of individual control over utilisation of resources; community agreement and cooperation necessary (Tragedy of the Commons);
- Pressures on pastoralist systems (loss of traditional grazing areas and water points, increased human and livestock populations, reduced mobility, government interference in decision making etc) are undermining the traditional procedures for decision making, management of grazing areas and water points, and control of livestock movements;
- There is an increasing tendency for pastoralists to become agro-pastoralists in order to broaden their economic base;
- There is an increasing tendency of range enclosure, much of it illicit. It starts with enclosure of crop fields and becomes extended to areas of grazing;
- Wildlife conflicts (competition for water and grazing, disease transmission, predation) can be problematic.

Livestock ownership and herd/ flock sizes

In a normal commercial livestock

enterprise the primary objective is to maximise sales (on a sustainable basis) of animals or animal products - meat, milk and/or wool. Where the principal product is live animals (for beef, pork, fat lamb etc), the primary objective is facilitated by maximising turnover, i.e. animals are reared to a desired age or weight and promptly sold. Commercial farmers know exactly the areas and boundaries of their properties, they have direct control over stock numbers and distribution on their properties, they know quite accurately the number of livestock that their properties can support in good and bad rainfall years, they pay close attention to the range condition and trend, and they reduce stock numbers (or buy in feed) when grazing is scarce.

Pastoralists, however, are generally subsistence oriented, their grazing areas are communal or open access (individuals only have control over their own livestock) and seldom clearly defined, and their reasons for livestock ownership are more varied and complex that in commercial enterprises. They include:

- Store of wealth
- Status
- Mobility
- Pleasure in owning and looking at own livestock
- Source of meat, milk, blood, hides and dung
- Transport and draft power

Whereas commercial farmers own livestock in order to sell them or their products, pastoralists own livestock in order to meet their subsistence requirements and, if possible, to increase their herd/flock sizes. Herd/flock sizes tend to be widely skewed in pastoralist societies, with the majority of herders owning tens, while a few own hundreds of head. However, the reasons for selling livestock tend to be the same: to meet immediate cash needs.

The principal reasons for needing to realise cash are household needs; school fees, books and uniforms; medical expenses; veterinary expenses; and animal feed.

Owning a mix of livestock species facilitates selection of an animal, or group of animals, to meet a specific cash need. A cow or steer would not readily be sold where a sheep or goat would suffice. Camels are highly valued and rarely sold if other livestock species are available. Livestock are rarely slaughtered for home consumption unless they are ill or injured. Meat from animals which die is seldom wasted.

An important consequence of only selling animals to meet cash needs is that higher animal prices mean that fewer head need to be sold to meet the cash need. Hence there can be a perverse market response to increased prices, as demonstrated in Swaziland by Doran, Low and Kemp (1979).

Another significant use of livestock in pastoralist societies is payment of the bride price (lobola in southern Africa), which is set in numbers of head and payable by the suitor to the father of the bride. This is the opposite of western dowries, payable by the bride's family to

the groom or groom's family.

Offtake levels tend to be low (<10% for cattle compared to 30+% on a commercial beef ranch) but birth rates are also generally lower and mortality rates higher, so herd/flock growth rates are slow and livestock numbers can be reduced by disease or decimated by drought. The uncertainties of water and grazing, the probability of droughts, the lack of individual responsibility for range condition, and the risks of livestock disease, predation or theft all contribute to a rationale of herd/flock maximisation. Simply put, stock numbers are the best insurance against stock losses.

Whereas, in earlier times pandemics such as rinderpest would wipe out whole herds of cattle and wildlife, the pandemic diseases have been eradicated and vaccination programmes largely control the major infectious diseases. Veterinary programmes enable more animals to be born and more to stay alive, and drought now remains as the major factor limiting livestock populations in pastoralist communities.

A contributory factor to the conflict in Darfur is the blocking by settled agro-pastoralists of access to crop residues and water points by the nomadic pastoralists

Land tenure and range degradation

Traditionally, tribal groups and clans recognise their own territory and, within a tribal or clan area, the grazing is generally open to all members of that group. Owing to vagaries of rainfall and consequent availability of grazing and water, loose reciprocal agreements between clans are common. However, in many countries the governments have reduced the influence of tribes and clans, and replaced it with state jurisdiction (tribalism is seen to be a hindrance to national development). Thus the traditional procedures for controlling grazing and water have been weakened, the recognition of boundaries has been eroded, and pastoralist groups are less able to keep their traditional grazing areas for their own use. These factors, combined with the increase in human and livestock populations and the loss of grazing areas to crop production, put great pressure on the rangeland. Inevitably, the areas selected for expansion of crop production are those with the best soils and/or rainfall, hence the proportional loss of grazing is often greater than indicated simply by the number of hectares subtracted.

Traditionally practised pastoralism is an ecologically sound, low impact form of land use, typified by the Maasai of Kenya and Tanzania. Within tribal and clan groups, land tenure was not an issue as there was enough for all. Such pastoral-

ism enjoyed large areas in which to move in search of water and grazing, low overall stock densities and generally peaceful co-existence with the wildlife. When grazing or water became scarce in one locality, the herders moved their livestock to a new area, and did not return to the first location before the grazing had recovered, thus the grasses were stimulated and fertilised by being grazed but not weakened by being over-grazed. However, as overall stock densities have increased, and there are no longer empty areas to move to, the ecological balance is being lost and in many areas traditional pastoralism has become unsustainable.

In the changed circumstances of human and livestock population pressures, the issue of land tenure has become one of the most significant factors impacting on range condition and range degradation. The implications of open access on responsibility for sustainable resource management have been eloquently described by Hardin (1968) in his seminal treatise 'The Tragedy of the Commons'. In essence this states that the incremental benefit of putting an extra animal onto the rangeland accrues entirely to the individual who owns the animal, but the incremental degradation caused by that extra animal is shared by the community, hence it is always in the individual's interest to add another animal to his herd regardless of the degradation caused: "Each man is locked into a system that compels him to increase his herd without limit - in a world that is limited." Sociologists have criticised Hardin's theory, but its premise does have wide validity to shared use of resources, and not only to grazing.

For decades communal grazing areas have been widely regarded by expatriate agriculturalists as seriously overgrazed and degraded yet they have continued to support larger numbers of animals than would be maintained on commercial ranches. This has brought the concept of carrying capacity and range degradation into question in recent years, and there is now general agreement that in arid and semi-arid areas (brittle environments) carrying capacity estimates have limited value in communal rangelands because seasonal variations in rainfall are so high (Behnke and Scoones, 1993). It is a fact that the lower the mean annual rainfall, the higher the coefficient of variation. Commercial ranches tend to stock conservatively, preferring to have surplus grazing in good years than large deficits in bad years; communal area herders rarely have that luxury of choice.

An important factor often missed by aid and extension workers is that both range condition and range degradation should be defined in context of the objectives of the production system. Thorn bush may be considered to represent poor range condition for cattle or sheep but excellent condition for wildlife or goats. Similarly, a vegetation state that would be considered too poor to support target weight gains in commercial ranching might adequately support larger numbers of animals at a lower level of pro-

duction per head but a higher overall production per hectare (e.g. de Ridder and Wagenaar, 1984).

Nonetheless, there is no doubt that range degradation does exist, is taking place in many communal grazing areas, and has reached disastrous levels in some. However, there is a widespread reluctance among livestock owners to acknowledge that the degradation they can see is caused by the existence of too many livestock (overgrazing), and it is common to hear the cry that the problem is due to rainfall being lower than it used to be - even where rainfall records do not support the contention. Another cry is for more grazing land to be made available. Many pastoralists and communal area herders have not yet accepted that their grazing areas are a finite resource, and that there are no longer any empty areas to move to. Because livestock ownership is so fundamental to their psyche, they tend to regard stock numbers as the independent variable in the relationship with grazing area. Voluntary control of stock numbers by a community is not a considered option, partly for the reasons above and partly because the majority of herders have small herds and those with large herds are the most influential in the community and would block attempts to limit their animal numbers. Compulsory destocking and control of stock numbers has been tried by colonial governments but is too unpopular for most governments to contemplate.

The inevitable consequence of increasing pressure in communal rangelands is a tendency towards enclosure as a means of privatising resources. Traditionally in most agro-pastoral communities the croplands are privately owned but become open access after the crops have been harvested. However, increasingly the croplands are being enclosed and reserved for exclusive use by the owners, and increasing areas of grazing are being enclosed (and appropriated) by more influential stock owners. A contributory factor to the conflict in Darfur is the blocking by settled agro-pastoralists of access to crop residues and water points by the nomadic pastoralists. Similar problems are experienced by the nomadic Fulani pastoralists in Nigeria. In northern Namibia, unauthorised enclosure of substantial areas of communal rangeland has become problematic.

Attempts to introduce ranching into pastoralist communities

A major mistake made by aid agencies has been the attempt to transfer the American ranch model into African rangelands, and assume that the erection of fencing and provision of water points would convert subsistence herders into commercial ranchers. In Botswana a large number of ‘turn key’ (i.e. ready to move into) fenced ranches were established in a block in the western Kalahari and allocated with exclusive tenure to groups or individuals with large herds as part of the Tribal Grazing Land Policy of 1975. The results were disastrous (Bekure and Dyson-Hudson, 1982); the fencing blocked wildlife migratory routes, the ranches were hopelessly

overstocked and a substantial chunk of pristine Kalahari was ruined. In Kenya a number of group ranches and co-operative ranches were established for the Maasai, but they have also caused problems of blocking movements of other herders, eroding traditional authority to control grazing, and pressuring for subdivision to individual tenure (Bekure, de Leeuw, Grandin and Neate, 1991).

In group ranches, a number of individual herd owners share a designated area within a fenced boundary. Each owner maintains responsibility for care and management of his own animals, hence competition for grazing develops as stock numbers increase, unless a fixed limit can be agreed or imposed. In a co-operative ranch, a number of individuals jointly own the livestock herd and a ranch manager is normally appointed. Pastoralists are reluctant to lose individual ownership of their livestock and this system is more suited to wealthy livestock owners than to small herders but it does stand a better chance of being operated sustainably and commercially.

The principal drawback of enclosure is that it restricts mobility to track grazing and water according to availability, unless very large areas are enclosed or conservative stocking rates are applied. Furthermore, fencing is not a guarantee of sound management. In fact, fencing in communal grazing areas causes more problems than it resolves. Commercial ranches use fencing to keep their animals in a designated area, whereas fencing in communal areas is designed to keep other people's animals out.

Enclosure leads to privatisation of communal rangeland by an influential few, and disenfranchisement of the majority. Shareholders in group or co-operative ranches who become disillusioned sell their shares to wealthier members of the group, who gradually increase their holding. A precursor can be the subdivision of a group or co-operative ranch into parcels for each shareholder, but these parcels are invariably sub-economic and are bought by the wealthier shareholders.

Commercial ranches compared to pastoralism

Commercial ranches are generally able to maintain a healthy range condition and high levels of animal production, whereas pastoralist grazing areas in comparable vegetation types and rainfall zones are tending to become increasingly degraded and animal productivity levels are falling. Why?

Some of the differences between the two types of production system are summarised in Table 1.

Principles for management and development of pastoralism

The following recommendations apply widely to all forms of pastoralism and agro-pastoralism (settled and unsettled) in communal areas:

1. The first step is to understand what there is, where it is, how it works, why things are done as they are, who are the stakeholders and what are the decision

Table 1: Characteristics of commercial ranching and pastoralism

Commercial Ranching	Pastoralism
Clearly defined boundaries	Undefined or vaguely defined boundaries
Number of ha accurately known	Number of ha vague or unknown
Number of animals accurately known	Number of animals vague or unknown
Individual or defined group tenure	Communal ownership/usufruct
Number of herd owners per ranch constant	Number of herds and herd owners increasing
Single manager/decision maker	Management decisions must be made by consensus
Centralised control over location and movements of all livestock	Little or no centralised control
Normal carrying capacity known	Carrying capacity of limited relevance
Stocking rates kept within estimated carrying capacity	Stocking rates unknown and largely uncontrolled
Objectives are commercial	Objectives are subsistence and wealth
Narrow range of reasons for livestock ownership	Wide range of reasons for livestock ownership
Aim to combine production/head with production/ha	Animal numbers more important than individual productivity
Cull surplus and unproductive animals	Only cull to meet particular need
Objectives maximised by increasing turnover	Objectives maximised by stock accumulation

making processes – before trying to change anything.

2. The second step is to let the different socio-economic strata of the community identify and prioritise their problems.
3. As far as possible, the problems should be tackled in the order of priority identified by the community, rather than coming in with a pre-conceived idea (such as overgrazing) to be the focus of a project. Overgrazing is seldom high on the list of community priorities and it is important to build confidence by dealing with more basic problems (e.g. human health, animal health, domestic water, school books etc) before, or simultaneously with, tackling complex

issues such as overgrazing. Stock water is almost always stated as a high priority but should be considered carefully in context of range condition and grazing management (see below).

4. Ideas may be introduced but the actual initiative for change should come from the people.
5. Communities and aid/extension workers must understand key principles of grazing management:

- Grazing land that is heavily stocked without rest periods will become degraded;
- Even rest periods cannot prevent grazing from becoming degraded if the stocking rates are too high;
- It is difficult to restore degraded pastures to their former productivity without substantial investment e.g. for bush clearing and/or reseeding;
- It is pointless to invest in rehabilitation while the primary causes of the degradation (e.g. overstocking) remain.

6. Communities must be encouraged to accept that their grazing area is a finite resource and that they must take responsibility for looking after it.
7. Boundary recognition is an important precursor to the acceptance of management responsibility and control of access by outsiders and their livestock. However, rigid boundaries between communities are often inappropriate because rainfall is variable and hence mobility to track water and grazing is important.
8. Reciprocal user rights (with controls) should be encouraged between adjacent communities to allow for spatial variability of grazing and water.
9. Control of water points gives de facto control of the surrounding grazing but permits some boundary flexibility, so reducing boundary disputes. Hence, communities should be assigned ownership and management responsibility for all water developments in their grazing areas.
10. Water point spacing and capacity provide the most effective means of controlling stock numbers and distribution in communal grazing areas. All water developments for livestock should be designed (spacing, capacity, output) to improve the efficiency of utilisation of the available grazing without causing its over-use. Oversupply of water is a major contributor to range degradation.
11. The capacity of water points should be determined according to the required period of supply and the number of livestock to be watered, which in turn is a function of the grazing radius to be served and the estimated carrying capacity of the area.
12. Wet season grazing areas and dry season grazing areas should be distinguished where possible.
13. Permanent water supplies (e.g. boreholes, large dams) lead to permanent settlement and should only be established in dry season grazing areas.
14. Water supplies in wet season grazing areas should be based on surface water catchment (hafirs, dams) and be designed to hold water for a limited period (e.g. 3-4 months) beyond the end of the

wet season.

15. Livestock ownership should carry a realistic cost so that there is a disincentive to maintain unproductive or surplus animals. This means that services should be paid for and subsidies should largely be removed. Cost sharing should be a principle of infrastructural development and maintenance.
16. Communities must feel a sense of ownership or proprietorship over infrastructural developments (e.g. fencing, water) if they are expected to maintain them. The surest way to achieve this is to secure contributions in cash or kind to the developments.
17. Livestock marketing should be facilitated through improved information services (e.g. radio broadcasts) and access (e.g. roads).
18. Drought early warning systems and price incentives can be used to encourage herders to sell stock early in a drought before they lose too much condition.
19. Conventional school curricula in pastoralist areas are often inappropriate as they leave young people with enough education to be dissatisfied with their pastoralist life without equipping them for anything more. There is a need for training pastoralists and agro-pastoralists to be better pastoralists and agro-pastoralists.
20. Development programmes should work through local institutional frameworks where possible, in spaced logical steps, and with realistic time scales. Relatively short time frames imposed by funding agencies demand a sense of urgency seldom felt by the recipients, and carry the risk of acceptance without commitment (Sweet, 1987).

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GSSA Prestige Symposium

Rehabilitating rangelands

Thursday 17 April to Friday 18 April 2008
Bishopstowe Hall, Pietermaritzburg, KwaZulu-Natal

Alan Short
KZN Department of Agriculture and Environmental Affairs
Email: Alan.Short@dae.kzntl.gov.za

Introduction

Rehabilitation of degraded veld has become a major area of concern, as more and more land is used for mining, forestry, agricultural development or is simply overgrazed. Invasion of alien species is a worldwide problem, as invasive plants cause massive ecological damage with important socio-economic consequences such as diminished water availability and reduced grazing capacity.

It was to address these issues that the Grassland Society of Southern Africa, through Justin du Toit of the University of KwaZulu-Natal and Freyni du Toit of dNA Solutions, arranged a GSSA Prestige Grazing Symposium on rehabilitating rangelands.

The event was attended by 95 people from all over the country and from neighbouring countries. There was even an apology from Hugh Pringle of Australia, who forwarded a recent paper that he and Ken Tinley published on managing degradation in a landscape rather than local context (Pringle and Tinley 2003). Participants represented a variety of government and parastatal institutions, as well as the private sector.

The talks could be broadly divided into two categories: the rehabilitation of degraded ecosystems, and the control and management of alien plants. There were a couple of talks that did not fit neatly into either of these categories, but they were interesting enough to deserve a place of their own. Both major sets of talks contained discussions both about the technological processes involved and the socio-economic implications of different strategies.

Controversial discussion

Iain Buchan, a landowner from Nottingham Road, kickstarted the day

by giving, in no uncertain terms, his opinion of the role of forestry companies in clearing up their land before moving on. Iain bought a property owned by a major forestry company which had recently been cleared of about 80 ha of pine plantations. However, the problem of managing the existing aliens, the soil erosion and the massive seedbank of invasive species was largely left to the new owner – Iain. He gave a detailed account of his negotiations and fights with the forestry company, and revealed to us that he would soon be taking them to court. The results of the court application could have important consequences for the future, and anyone dealing with similar issues might be well advised to follow the case with interest.

"Many lands established to biofuels will need to be established to something more useful".

Oil drums and snakes: rehabilitating degraded veld

Kevin Kirkman, Professor of Grassland Science at the University of KwaZulu-Natal in Pietermaritzburg, followed with a summary of his team's efforts over the past few years to develop simple, cost-effective technology to harvest indigenous grass seed from the veld and replant it in degraded areas. As Kevin put it, "in about ten years, many lands established to biofuels will need to be established to something more useful".

One of the seed harvesters developed was called by him the "Castrol seed harvester", although everyone else knows it as the "Kirkman combine". Justin du Toit reported on it in the 10 December 2004 issue of *Farmer's Weekly*. Simply put, it is an oil drum cut in half, the two halves welded end to end, and mounted with a simple frame on the front of a bakkie. The leading edge of this trough is serrated, and the bakkie is driven through the veld at the right season. The amount of seed collected by the Kirkman combine is phenomenal. The Grassland Science section has also developed more sophisticated, tractor-mounted vacuum seed harvesters, which are also extremely effective.

However, the planting of the seed has caused more headaches. A large variety of seed is collected, of all shapes and sizes, as well as a great deal of extra plant material, insects, and the odd snake. Cleaning this mixture is extremely difficult and expensive. The seed must be stored correctly for about a year to break dormancy, and the various species (as well as other bits and the odd snake) need to remain evenly mixed when planted. Eventually, the team struck on the idea of using a modified gel planter, as used by the vegetable industry. The seed is mixed into a thick, wa-

Justin du Toit opens the Symposium

ter-based gel and squeezed from the end of the planter like toothpaste from a toothpaste tube.

Much work still needs to be done to overcome technical hitches and to gain a better understanding of the ecological processes involved in using wild-harvested seed for rehabilitation, but the progress so far is exciting.

Justin du Toit presented the results of his research into a completely different technique of rehabilitating grasslands – harvesting grass tufts in the wild and multiplying the tillers in the nursery. With correct management, the grass tillers can multiply quickly – in some cases, more than one new tiller per day per parent tiller. The tillers are then planted by hand into the area to be rehabilitated. Variables that need to be considered are the density and season of planting and the history of the land that is being planted. In the case of previously cultivated lands, the residual fertility may in fact be too high for most of the indigenous grasses, particularly *Themeda*, which is easily outcompeted by other plants in high-fertility soils. Post-planting management is also crucial; weeds may need to be managed, as many veld grasses (especially in sourveld) have a low tolerance for shade. The area may need to be regularly burnt or mown.

Many different kinds of wastes are generated by industry and households, and management of these wastes is a growing concern. An ideal solution to managing the wastes would be to put them to some use. Louis Titshall of the University of KwaZulu-Natal presented the results of his Master's research into using sewerage sludge to rehabilitate coal mines. He ran greenhouse trials with different grass species grown in sewerage sludge with different amelioration treatments, and found very mixed results. Some grass species required sewerage sludge to be ameliorated, while others showed greater production in the non-ameliorated sludge. Every waste product is chemically and physically unique, and few generalisations can be made about possible uses for or treatments of waste products.

Terry Everson summarised her years of effort in the Drakensberg to encourage a community to rehabilitate their degraded veld and to bet-

ter manage their land. Many of her team's efforts have been highly successful – most importantly the sense of ownership that many community members now feel for their veld as an important resource. She established a monitoring group, which for the last six years has been using very simple and useful techniques to monitor the effectiveness of their erosion control and veld management efforts in reclaiming degraded land. The monitoring group, on their own initiative, have begun educating schoolchildren about the importance of managing natural resources sustainably. The kids "adopted" a donga of their own, and have begun rehabilitation efforts in their donga. Importantly, the simple instruments that were used by the monitoring group to measure soil movement and donga reclamation are no longer being used as toys by the children.

If payment for carbon sequestration or other ecosystem services becomes a reality, then communities like the one she worked in for so long have a real chance of being properly compensated for conserving their resources.

Damien Walters of the Mondi

Wetlands Project talked about the challenges his team faced in getting farmers to realise the importance of conserving their wetlands. The technology for rehabilitating wetlands is well-established, but the human use of wetlands has often been neglected by the engineers. Until recently, the Mondi Wetlands Programme was primarily a poverty-relief programme. The Programme would simply approach a landowner and ask for permission to access his land to "fix" a wetland. The landowner would usually accede happily, but months or years later might rapidly change his mind once his potato fields became flooded by the now-functioning wetland. The Mondi Wetlands Project is therefore embarking on a new management strategy of involving the landowners far more thoroughly in the rehabilitation process and the post-rehabilitation management of the wetland.

Don't kill the pretty flowers: Alien plant control and ecology

Michael Braack of the KZN Department of Agriculture and Environ-

mental Affairs' Alien Invasive Plant Programme graphically demonstrated the pitiful budget that is allocated to alien plant management relative to the need, by slicing up a small piece of paper with a pair of scissors: if the budget requirement for alien plant control was the size of the room, the total allocated budget was the piece of paper. Of course, half of that goes on salaries, a considerable portion on administration and bureaucracy, a large percentage on meetings and catering; leaving a small sliver of budget left for actual physical control of alien plants.

Nonetheless, the Alien Invasive Programme has achieved some success by focussing its resources where they can do the most good. Several teams are stationed around KZN, focussing purely on emerging weeds - weeds that are not yet a problem in the province, but will become important pests if not managed. One example is pompom weed (*Campuloclinium macrocephalum*), a major problem in the grasslands of Gauteng. Research conducted by the Agricultural Research Council's (ARC) Plant Protection Research Institute showed that herbicide spraying programmes needed to be concentrated before pompom weed begins to flower; any spraying thereafter would be a waste of resources as the seeds would still be viable. Michael presented various sensible proposals to allocate resources effectively.

One of the major issues faced by alien plant control programmes is public ignorance: many category 1 alien plants are introduced and spread as ornamental plants. A good example of public antagonism to alien plant control is the case of the Formosa lily (*Lilium formosanum*), a beautiful but aggressive invader of wetlands.

Michael also presented the unique programme that he runs at Cedara, planking timber and building coffins. Only free-standing alien timber that is not economically viable for commercial contractors to remove is chosen for the programme – the programme is not intending to put operators out of business. The coffins that are built range from relatively luxury coffins to basic wooden coffins with rope handles, selling for less than R300. There is a desperate need for these bottom-of-the range coffins to bring some dignity to the funerals of poor people, who are often buried in little more than a blanket.

Terry Olckers was employed at the ARC's Plant Protection Research Institute for many years, searching for biocontrol agents for bugweed (*Solanum mauritianum*). About four years ago he moved to the University of KwaZulu-Natal, having nearly lost hope in finding an effective biocontrol agent. After years of effort, two biocontrol agents had been identified, one insect species, the bugweed lace bug (*Gargaphia decoris*) that attacked the leaves and another insect, a flower weevil, that attacked the flowers (*Anthonomus santacruzi*). The lace bug had been released some years previously but with little apparent impact, while the unbelievable bureaucratic delays in approv-

ing the flower weevil (four years from application to approval, *after* years of testing had been carried out), had resulted in the latter programme being put on hold. However, a colleague in Sabi phoned him last winter "voice trembling with excitement" to report that an entire forest of bugweed had been defoliated by the lace- bug. Some unknown combination of factors had caused a population explosion in the insect which had devastated the local bugweed population. Unfortunately, before any more information could be gathered, the forest and the lace- bug population were destroyed by the devastating plantation fires last winter. Terry appealed to anyone who observes the leaves of bugweed being significantly attacked to let him know (contact the GSSA for more information). The flower weevil is in culture at the University with a postgraduate student doing research on it.

A reasonably well-known and unsurprising weed in pastures, sugar-cane and orchards is a low-growing herbaceous plant from South America called *Richardia brasiliensis*. Recently, the plant has been noted in degraded and heavily-grazed veld in the KwaZulu-Natal midlands and in other humid grasslands of South Africa. Alan Short presented some preliminary results from herbicide and burning trials conducted on a farm near Nottingham Road, on the abundance of *Richardia* in the veld. Very little is known about the ecology of *Richardia* in natural veld. The fire trials were inconclusive, probably because the fuel loads were too low to have any effect on the weed. The herbicide trials showed that 2,4-D performed better than bendioxide in controlling *Richardia*, but that the effect was relatively short-lived. The question remains whether *Richardia* needs to be classified as another emerging alien invasive plant, or whether its distribution in veld is limited to already degraded areas.

"Biofuels – the biggest scam on Earth" (Time Magazine)

Time Magazine (Grunwald 2008) recently ran a cover feature exposing the ecological destruction and economic mayhem being caused by the current global obsession with biofuels, and highlighting the net carbon increase caused by biofuel farming in many parts of the world (virgin lands being transformed for agricultural production, causing carbon to be released into the atmosphere).

Helen King of the University of KwaZulu-Natal, citing recent work by David Tilman (Tilman *et al.* 2006), described how degraded agricultural land, rehabilitated with low-input, high diversity plant mixtures, can be used for biofuel production. The potential ecological benefits of harvesting degraded grasslands for biofuel production, rather than transforming them for crop production, could be enormous. Tilman calculated the net carbon balance from harvesting species-rich plots (16 spp) (as opposed to species-poor grassland crops such as switchgrass) to be negative – that is, more carbon

would be sequestered underground than released into the atmosphere once the fuel was produced and burned. Crops grown for biofuels are now being seen as carbon-positive – more carbon is released into the atmosphere by the production of biofuels from these crops than is conserved.

The carbon stored underground in rangelands is enormous, but the international community has yet to acknowledge the role of anything other than forests in carbon sequestration.

There is growing awareness around the world that biofuels are not the "win-win" product that many thought them to be. Even if every square inch of arable land on the planet was converted to biofuel crops such as maize, soya, or sugar cane, the impact on global fossil fuel consumption and greenhouse gas emissions would be negligible, and the economic impact in terms of food production would be enormous. The current global increase in food prices is partly blamed on the amount of crops being diverted to biofuel production.

Field trip

Justin du Toit took the delegates around his various rehabilitation trials the next day, ranging from the nursery where he propagates the plants he uses in his work, to the final product on two very different sites in the midlands. The first site was on formerly cultivated lands near Howick, where the residual fertility was very high and weed control was a top priority. The second site was on Iain Buchan's land near Nottingham road on former plantation land. All the sites generated a great deal of discussion and debate about the relative merits of different rehabilitation methods.

The Symposium was extremely successful in achieving its ends: to bring together practitioners dealing with practical problems of rehabilitation and to generate ideas and discussion. The fact that there were several people from the private sector present shows that rehabilitation of degraded rangelands is an issue that is becoming increasingly important to industry as well as to traditional conservationists.

The event will be held annually from now on, with the aim of presenting the latest technology and experiences in rangeland rehabilitation from around southern Africa.

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GSSA Congress 43

Implementing New Approaches to Range and Pasture Management

21 to 25 July 2008

Aventura Badplaas, Mpumalanga

Freyni du Toit
admin@grassland.org.za

The preparations for the annual GSSA Congress are progressing fast. Make sure you submit your papers soon!

Several symposia, workshops and session themes are already taking shape, as listed below. Download the Preliminary Programme (as of 14 May 2008) or go to the details of Scientific Programme from the GSSA website .

To submit titles and abstracts for inclusion in the Congress, please register.

Deadlines

Early Bird Payments: 30 April 2008 (Deadline has passed)
Submission of Abstracts: 16 May 2008

Registration and Fees

You can either register online, or download the registration form and email or fax it to us.

Go to the Congress website to see details of Congress fees for students, day visitors or full congress delegates, with or without accommodation.

Scientific Programme

Dr Richard Stirzaker will be presenting the the keynote address on Tuesday morning. Dr Stirzaker is based within the Agricultural Soil and Water Dynamics research group, CSIRO, Australia, which is part of the Irrigation and Water Resources research program. His current work revolves around the development and commercialisation of the FullStop Wetting Front Detector, a simple device to help irrigators improve water, salt and nutrient management. His team was awarded the International WATSAVE Award for Water Conservation in Agriculture in 2003. Richard also holds a honorary professorship at the University of Pretoria, South Africa. Visit his website to find out more about him at www.clw.csiro.au/staff/StirzakerR/

A variety of symposia, workshops and special sessions aare planned, including:

- Plenary Session: Linking Planted Pastures with Natural Rangelands - Knowledge gained in the past 25 years

- The Ekangala Grassland Project, Wakkerstroom, Mpumalanga
- Workshop: Teaching Rangeland and Pasture Science
- Symposium: Savannas - How has our knowledge grown since the biome projects?
- Session: Fodder Production from Planted Pastures
- Workshop: Farmer Development: New Approaches to Rangeland and Pasture Management
- Session: Ecosystem Ecology in Rangelands
- Workshop: Remote Sensing & Rangeland Management
- Special Session: Legumes and Old Lands
- Session: Land Transformation and Rehabilitation
- Symposium: Adaptive Management
- Session: Rangeland Fodder Production and Quality
- Session: Invasive Plants and Bush Encroachment
- Session: Biodiversity Initiatives and Conservation Planning
- Symposium: Linking Terrestrial and River Systems – watershed management and impact on river ecosystems

Post-Congress Tours

The Badplaas Region: Agricultural Diversity

Visits near Badplaas focusing on changes in vegetation and farming practises including citrus and forestry

The Kruger National Park: Science and Tourism All in One

Including a visit to scientific services, the rhino bomas and exclosures, long term burning trials plus some game viewing

Venue Information

Forever Resort Badplaas, Mpumalanga, South Africa

The escarpment and the Lowveld, a subtropical wildlife haven, form a transitional zone between this grassland area and the savanna biome. At the foot of Mpumalanga's Hlumuhlumu (“place of much thunder”) mountains, 283km east of Johannesburg lies Badplaas, a small town famed for its hot mineral springs which are known locally as the healing springs, “Emanzana”. Standerton, about 200km to the south-west of Badplaas, is known for its large dairy industry, and Ermelo, some 80 km south-west of Badplaas, is famed for its wool production.

Sponsors

Two hundred delegates - scientists, technicians, students and managers - will be attending the Congress. If you or your company would like to sponsor the 43rd Annual Congress of the Grassland Society of Southern Africa, please contact Freyni du Toit.

Notice to all members

GRASSLAND SOCIETY AWARDS

The Council of the Grassland Society of Southern Africa calls for nominations for the following Society Awards:

- Prestige Award (outstanding contribution to the science of the discipline)
- Meritorious Award (service to the discipline of Grassland Science)
- Young Scientist Award (for an outstanding young scientist)
- Honorary Membership (outstanding contribution to achieving the aims of the Society)

All nominations must be fully motivated and supported by at least three members in good standing. Nominations should arrive by post before 11 July 2008. Alternatively, hand and email delivered nominations will be accepted at the Congress until midday on 22 July 2008.

Please send nominations to The Administrator via:
Post: PO Box 41, Hilton, Pietermaritzburg, 3245, South Africa
E-mail: admin@grassland.org.za
Fax: +27 (0)86 622 7576

Full descriptions of the awards and their criteria appear below. Please consider these when making your nominations.

Grassland Society of Southern Africa Prestige Award

This award is made to the scientist whose work has made a significant impact on range and forage science and/or practice.

Objective: The primary aim of this award is to encourage the scientific advancement of the discipline of range and forage science in Africa. It is aimed at all research fields that have an influence on the development of science, and applies to research work that breaks new ground in the discipline.

Criteria: This award should only recognise outstanding contributions to the science of the discipline.

The research programme or the interpretation should be innovative.

The results and, in particular, the interpretation which is applied to them should have a substantial impact on the discipline.

Signed nominations must be submitted in writing together with a motivation to the Honorary Secretary (as per Constitution).

Decisions regarding this award are made by secret ballot or unanimous vote at a Council meeting.

It is not mandatory for this

award to be made at each Congress.

Grassland Society of Southern Africa Meritorious Award

This award is made to a member of the GSSA in recognition of exceptional service to the Society.

Objective: The primary aim of this award is to encourage active and meaningful participation in the running of the GSSA. It is not made in recognition of research but rather for contributions to the development of the Society.

Criteria: The recipient must have contributed significantly to the development of the Society over extended period of time.

The GSSA must have benefited from such contribution in some manner, (i.e. an inactive Council member serving on the Council for more than five years does not qualify).

Signed nominations must be submitted in writing together with a motivation to the Honorary Secretary (as per Constitution).

Decisions regarding this award are made by secret ballot at a Council meeting and require a two thirds majority.

It is not mandatory for this award to be made at each Congress.

Young Grassland Scientist Award

Objective: This award is made to encourage new researchers in the discipline.

Criteria: The award is available only to members of the Society who have been involved in scientific research in the discipline for less than five years by 31 January of the year in which the Congress is held.

The award is made to an individual only once.

The award should be made on the all-round performance of new scientists. Factors which should be taken into consideration include the quality of the research and its presentation (in the form of both Congress presentations as well as publications), as well as the potential impact the research has on the discipline of range and forage science.

At least one peer-reviewed scientific publication and one formal conference presentation (no posters, and not necessarily at the GSSA Congress) must be made by every nominee. The amount of supervision associated with such presentations of research must be taken into account.

Signed nominations must be submitted in writing together with a motivation to the Honorary Secretary (as per Constitution).

Decisions regarding this award are made by secret ballot at a Council meeting.

It is not mandatory for this award to be made at each Congress, and the award may be made to more than one person in any particular year.

Grassland Society of Southern Africa Honorary Membership

This award is made to a person whom the Society wishes to honour by reason of meritorious services rendered for the realisation of the objects of the Society or by reason of his/her eminence in science.

Notice to all members

Nomination of office-bearers

The Council of the Grassland Society of Southern Africa calls for nominations for Office Bearers for the following positions on Council:

- Vice President - the VP contributes to the future direction of the Society by taking the role of President in the following year, and then outgoing president the year after. This post is challenging and important
- Public Relations Officer
- Honorary Secretary
- Honorary Treasurer
- Three additional members (one as Website Editor, other two to assist where needed)

All nominations must be supported by at least two members in good standing.

A nomination form is to be found below. Photocopy or cut out the form. Nominations should arrive by post before 11 July 2008. Alternatively, hand and email delivered nominations will be accepted at the Congress until midday on 22 July 2008.

Please send nominations to The Administrator via:
Post: PO Box 41, Hilton, Pietermaritzburg, 3245, South Africa
E-mail: admin@grassland.org.za
Fax: +27 (0)86 622 7576
Full descriptions of the Offices and the duties of the Office Bearers can be obtained from Freyni du Toit.

NOMINATION OF OFFICE BEARERS

We, 1. _____

2 _____

hereby nominate

_____

for the Office of

_____

of the Grassland Society of Southern Africa for the year **2008/2009**

If elected by the Annual General Meeting, I agree to accept the above-mentioned Office.

SIGNATURE OF CANDIDATE _____ DATE _____

PANNAR®

50 Years of Quality Seed

Success is in our Genes

A complete forage crop package

Nutritious green forage crops for excellent autumn, winter and spring grazing.

Forage Cereals
Dryland and/or supplementary irrigation

Oats

- DRAKENSBERG
- LE TUCANA

Triticale

- PAN 248
- PAN 299

Stooling Rye

- PAN 233
- PAN 263
- SOROM

Management Hint: For a balanced fodder flow and longer utilisation, plant more than one cultivar between February and April.

Intensive Forage Crops
Irrigation

Annual Ryegrass

- VOYAGER 55 and VOYAGER 31
- DARGLE
- MISPAH
- ENERGYL

Perennial Ryegrass

- QUARTET
- DOBSON

Tall Fescue

White, Red and Berseem Clover

Management Hint: Plant when maximum day temperature begins to drop below 25°C. Plant shallow and roll to ensure good contact with soil and moisture.

Forage Cereals Package:
Planting date and expected grazing period.

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
DRAKENSBERG	x									
LE TUCANA	x	xx								
PAN 248	x	xx								
PAN 233 & PAN 263	x	xx								
SOROM	x	xx								
PAN 299	x	xx								

LIVING

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FOR INFORMATION CONTACT:
MPUMALANGA AND LIMPOPO: Delmas (013) 665 6400
EASTERN FREE STATE AND GAUTENG: Heidelberg (016) 341 5881
FREE STATE AND NORTHERN CAPE: Kroonstad (056) 216 3000
NORTH WEST PROVINCE: Klerksdorp (018) 406 9808
KWAZULU-NATAL AND EASTERN CAPE: Greytown (033) 413 9500
DEVELOPING FARMERS (033) 413 9559
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GF/E/08/24