GRASSROOTS

Editor JULIUS TJELELE

Editorial

Dear Readers

I like to believe that all the delegates who attended this year's GSSA Congress 45 enjoyed it compared to last year's. There were a lot of students who presented their results and not just proposals. Credits must be given to their supervisors and/or mentors. A lot of people criticised the quality of papers and posters presented in Congress 44, Florida last year and yes it was a good critique which helped us improve. The organising committee of next year's Congress and subsequent Congresses must keep or improve the standard of Congress 45. It is not just the responsibility of the organising committee but all the GSSA members to improve the scientific quality of the Congress. To everyone who contributed to the success of Congress 45, keep up the good work.

Julius Tjelele

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GRASSROOTS

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Features

News

Regulars

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 jtjelele@arc.agric.za or admin@grassland.org.za or fax +27 (0)86 622 75 76

On the cover: Bare patch in one of the study sites with Pentzia inacana. Photo: Nelmarie Saayman.

Better environmental management practice integral to S.A agriculture

In celebration of the International Year of Biodiversity and World Environment Week, the World Wide Fund for Nature today unveiled its vision for Living Farms: An agricultural sector which farms in balance with nature. This vision is supported by two new products available from WWF. The Living Farms Reference, a comprehensive compilation of current legislation and better practices already demonstrated in many of the leading agricultural sectors and an overview report of the current status quo entitled Agriculture Facts and Trends, South Africa.

"Amidst the global concern of rising food insecurity, rapidly depleting resources and biodiversity in retreat, South Africa needs to pay particular attention to the economic, social and environmental sustainability of its agricultural industries, and today we celebrate our initial successes, the role of innovative farmers and an emerging trend towards farming in balance with nature" explained Mark Botha, head of the Living Lands unit at WWF.

The WWF report provides a snapshot of the overwhelming evidence that better environmental practices are central to ensuring ongoing productive agriculture in South Africa and to supporting food security in the long term.

"Better environmental practices are also crucial to limiting negative impacts on people's health and in ensuring that critical resources like water are conserved. Our country's limited water resources are severely threatened through (often illegal) over-abstraction as well as pollution from agricultural effluent, fertilizers and pesticides. Farming practices need to ensure that these natural systems, our catchments, rivers and wetlands are maintained in a healthy and functioning state - in a state that one would be happy for one's children to play in," continues Botha.

Healthy natural ecosystems underpin South Africa's economy and support productive agriculture. There are superb examples of many agricultural industries that have already taken decisive steps to protect these systems. Unfortunately, though, expanding agriculture is often the reason that many such natural ecosystems are under threat. According to the latest Red Data list published by SANBI, one in every five plant species in South Africa is threatened through agricultural expansion. Climate change will further stress agricultural ecosystems and food production, while agriculture itself is responsible for significant contributions to greenhouse gases and therefore to the increasing problem of an unstable climate.

Commercial farmers form the backbone of South Africa's efforts to maintain food security and yet farming is one of the least supported and most difficult livelihoods in South Africa.

"The South African agricultural sector is facing a huge challenge," Botha explains. "In the near future, using the same finite land area, we will have to feed a lot more people. This, in spite of reduced water quality and availability. We will need to use less nitrogen and phosphorous and will have to drastically lower greenhouse gas emissions. All this while a globalised commodity market makes each farmer's annual crop choice a gamble, where too few extension officers and researchers provide the new techniques or resource conservation training, and where rural livelihoods are ever more tenuous."

"We need to celebrate the successes achieved to date through various biodiversity initiatives within the agricultural realm and better support our farmers to enable them to provide food in a socially just and environmentally responsible manner," says Botha. "A key intervention is the WWF Living Farms Reference, which provides a comprehensive benchmark of current requirements for socio-economic and environmental compliance and better practice for sustainable farming."

WWF's Living Farm Reference is a step towards assisting farmers and key buyers in achieving better practices in the agriculture value chain from producers through to retailers, manufacturers and government.

"This is a first in South Africa," says Botha. "We set out to define a common language and understanding of and vision for what comprises a productive, well-managed farm, starting from a point of legal compliance. It took a year to create a harmonised master document for well-managed farms through a participatory process which included consultants, sector representatives, expert inputs, four large stakeholder workshops and an in-depth review."

"We need to acknowledge the importance of South African agriculture and our collective ability to meet the challenges ahead through better practices and appropriate interventions. We trust that these reports will provide a foundation to making the necessary tools and advisory support available in recognition and support of this vital sector within South Africa."

Source: WWF - Press Release

Students of SA Wildlife College team-up with SAEON Ndlovu Node

DR T SWEMMER,
Manager, SAEON Ndlovu Node

In May this year, students from the South African Wildlife College - located within the Greater Kruger National Park - again assisted SAEON's Ndlovu Node with long-term research. The students are enrolled in the College's Higher Certificate Course, which provides field rangers with the skills needed to advance to management positions. Dr Tony Swemmer, Manager of SAEON's Ndlovu Node lectured the students on vegetation monitoring. This included a field assignment in which students had to collect and analyse basic vegetation monitoring data and write a report of their findings. The data they collect contributes to a long-term dataset that the Ndlovu Node has been collecting at the College since 2008. In addition to the basic data that students collect each year as part of their training, more detailed vegetation data are collected by Node staff within permanent monitoring plots on and around the College grounds.

SAEON Newsletter

Wetlands Forum

Date: 26 October – 29 October 2010
Venue: Horseshoe Inn Hotel, Kimberley
Theme: "Caring for Wetlands – an answer to climate change"

The 2010 Wetland Indaba aims to provide opportunities to debate share and learn from local and international professional colleagues and partners. All relevant stakeholders and partners are invited to participate in discussions and workshops around the proposed topics. Papers based on case studies and best practice would be given preference.

Papers and poster proposals on topics such as the following will be considered for inclusion in the conference programme:

- Climate Change
- Biodiversity
- Wetland related research
- Sustainable utilization of Wetlands.

The deadline for receipt of proposals is 31 August 2010

For more information go to:
http://wetlands.z2a.co.za/

Council News

The Council met on 19 July prior to the start of Congress 45 2010 in Kimberley.

What a wonderful week of GSSA Congress 45 2010 has been. Thank you very much to the Organizing Committee who made it a memorable experience. Congratulations to all the award winners!

Some grass identification and veld management courses were hosted under the auspices of the GSSA during May – July 2010. This is a good way to promote the Society and all members are encouraged to organize similar events.

A Research Skills Workshop will be hosted at Grootfontein Agricultural Development Institute, Middelburg on 21 and 22 September 2010. This promises to be an interesting workshop for both experienced and young scientists.

Alan Savory will be visiting Hoedspruit in August to talk about Holistic Resource Management. He will be spending a couple of days in the veld with scientists and land users. Do not miss this once in a lifetime opportunity. For more information contact Mike Peel at mikep@arc.agric.za

Be on the lookout for a new webpage design during August. The new design will include social networking links such as Facebook and Twitter.

The Scientific and Publications Editors requests submissions for both the Journal and the Grassroots. It is also the 20th anniversary of the Bulletin of the Grassland Society of Southern Africa and any suggestions for the celebrations are welcomed.

The proposed GSSA budget for 2010/11 was accepted at the AGM with a membership increase of 4%.

New trustees as well as the Joint Allocations Committee were elected during Congress. Trust invites members to apply for disbursements.

Professional members have received membership cards. Progress has also been made with regards to SACNASP registration. The PAC Chairman invites comments and suggestions in this regard.

Eight student awards have been presented of which two were presented at the gala dinner at Congress. Congratulations to all the winners. Some progress has also been made to attract members from SADC countries. A representative of the GSSA is also needed to attend IRC. Please keep an eye on the website for nomination forms.

A new award has been proposed at AGM. The award – The Norman Rethman Planted Pastures Award – will be presented annually at Congress to the best planted pastures student presenter.

Congratulations and good luck to all the newly appointed Council members.

News

Agricultural Research Council-Africa Centre for Holistic Management

MIKE PEEL
Agricultural Research Council, Animal Production Institute
Email: mikep@arc.agric.za

Allan Savory and Jody Butterfield (Africa Centre for Holistic Management) to visit South Africa in August OR putting the 'ern' into southern African rangeland research

A short history and the way forward

There has been ongoing interaction between members of the South African research community and the Africa Centre for Holistic Management represented by Allan Savory and Jody Butterfield since Allan's visit to the Kruger National park in 2007. This precipitated a return visit to Dimbangombe near Victoria Falls, Zimbabwe by a group of scientists including Harry Biggs, Rina Grant, Vuyi Matokazi, Cathy Greaver, Tony Swemmer, Mike Peel, Luthando Dziba, Kevin Kirkman, Kate Matchett, Norman Owen-Smith, Wayne Twine and Richard Fynn. There was vigorous discussion around Holistic Management which has been criticized by rangeland scientists and how it had impacted on the savannas of Dimbangombe. Allan and Jody then returned to the Kruger National Park and neighboring Sabi Sand Wildtuin to share their insights under somewhat different management regimes.

In March 2010 four members of the ARC-API, Alan Short, Gilbert Pule, Luthando Dziba and Mike Peel visited Dimbangombe again in order to discuss the way forward. Most importantly we put together a proposal to start measuring the impacts of the Holistic Management approach on Dimbangombe (cattle and game) and surrounding areas that include a cattle and game operation, game only (hunting), a communal rangeland (where Holistic Management is being introduced) and a national park (Victoria Falls National Park).

The August Visit

In August Allan and Jody will again be visiting South Africa, this time the Hoedspruit area which has the additional challenge of fencing in many areas! The animals cannot move and this provides a unique set of challenges in terms of management (water provision etc.). The field day will take place on 17 August and you can pick up details from the GSSA website.

Allan Savory

Allan Savory was born in Zimbabwe, educated in South Africa (University of Natal – BSc Biology and Botany). He pursued an early career as a research biologist in what was then the Northern Rhodesia Game Department, and later the Southern Rhodesia Game Department, before turning to farming, game ranching and management consulting in Zimbabwe and elsewhere. In the 1960s he made a significant breakthrough in understanding what was causing the degradation and desertification of the world's grassland ecosystems and, as a resource management consultant, worked with numerous managers, eventually on four continents, to develop sustainable solutions. He served as a member of parliament in the latter days of Zimbabwe's civil war and leader of the opposition to the ruling party headed by Ian Smith. Exiled in 1979 as a result of his opposition, he emigrated to the United States where he co-founded the Center for Holistic Management with his wife, Jody Butterfield, and in 2009, the Savory Institute. In 1992 they founded the Africa Centre for Holistic Management near Victoria Falls, Zimbabwe, whose purpose is to enhance food and water secu-

The Buckminster Fuller Award award, Washington DC June 2010 (Photo ID, left to right: Jim Howell, Daniela Howell (both Savory Institute, or SI); Jody Butterfield, Allan Savory, Laurie Benson (SI), Ntombizakhe Mpofu (ACHM), Shannon Horst (SI), and Precious Phiri (ACHM).

rity and human livelihoods through training that utilizes livestock to restore degraded watersheds and croplands to health. Savory and Butterfield are co-authors of Holistic Management: A New Framework for Decision-Making (Island Press 1999) and Holistic Management Handbook: Healthy Land, Healthy Profits (Island Press 2006).

Jody Butterfield

Jody is currently Programme Director for the Africa Centre for Holistic Management's USAID-funded initiative: Land, Water & Livelihoods Restoration through Holistic Management (Southern Africa). A former journalist specializing in agriculture and environment, Jody has co-authored and edited numerous books, articles and papers related to Holistic Management with husband, Allan Savory. Through her work in Zimbabwe, she has gained first hand experience managing sustainable development efforts in the midst of economic and political disaster. In 2010 that work began an important expansion phase, covering the Southern African region, under the auspices of a $4.8 million, 3-year seed grant from USAID.

The 2010 Buckminster Fuller Challenge

Each year a distinguished international jury awards a $100,000 prize to support the development and implementation of a strategy that has significant potential to solve some of humanity's most pressing problems. In a unanimous vote, this year's jury members chose "Operation Hope: Permanent Water and Food Security for Africa's Impoverished Millions" as the winner of the 2010 Buckminster Fuller Challenge. Through Operation Hope, the Africa Centre for Holistic Management and its U.S. sister organization, the Savory Institute, have demonstrated how to reverse desertification by re-establishing the symbiotic balance between plant growth, soil building, water retention, and the behaviour of herding animals. The potential ramifications of this approach, known as Holistic Management, are enormous: from reducing droughts, floods, and food insecurity to mitigating climate change.

Sustainable Water Resource Conference and Exhibition 2010

Mbangiseni Nepfumbada, the acting deputy director of policy and regulation at the Department of Water and Environmental Affairs, delivered the opening speech at the Sustainable Water Resource Conference and Exhibition 2010. Speaking on behalf of the Minister, Buyelwa Sonjica, Nepfumbada delivered the following address.

"It is indeed a pleasure for me to be here today, to speak to you at the beginning of this conference and exhibition on Sustainable Water Resources focusing on solutions for South Africa. I guess it is also befitting that this day is the same day that the Portfolio Committee on Water and Environmental Affairs starts its site visits to selected parts of the country on Acid Mine Drainage and Hartebeespoort dam pollution management and rehabilitation - this being a follow up to the presentations that took place last week in Parliament. As usual what followed these engagements were headlines of doom and gloom of our water world's nearing its end and so on. Yet we forget that South Africa has never really had enough freshwater and this has been known for decades. Not enough water to go around, let alone water to allow for dilution, especially in areas where it is most needed where there is high level of activities such as in this very province. Some of us have been insisting that focus must be on solutions and innovation.

In this presentation, let me refrain from giving you so-called hard facts and numbers of successes and failure and so on. We can leave these to the engagements that will follow.

Ladies and Gentleman let me dare say that in fact by shouting water crisis we are probably missing the real point in that all that is done to ensure security of supply is done largely on the basis of this fundamental understanding that the country is generally not endowed with water resources. With increased development pressure, we are bound to have serious challenges of increased pollution and higher demands on water supply whichever angle we look at it – infrastructure development and maintenance, resource protection, water services provision, climate change impact, water and energy, water governance, water pricing and so on.

We can indeed argue about concepts and theoretical constructs of the business of water, however, the bottom line is that we have no choice except judiciously managing the resources and ensure provision of the services in a manner that improves the lives of our people in a sustainable manner. The level of awareness of conservation and demand management has to increase significantly if we are to succeed.

We can also not afford complacency resulting from the fact that those of us who are able to get together in these very beautiful facilities, drinking bottled water and enjoying the networking atmosphere, form a small part of our society. A great number of our people remain with limited access to water and other basic necessities. The link of water to all aspects of our lives need not be overemphasised.

I recall in these very same facilities when a few years ago, the Department lead a process of stakeholder engagement on Water Allocation Reform (WAR). In this meeting I recall the exchanges we had with community representatives and was interested to see that by and large our people are well aware of water issues and that we should involve them in many ways. In hindsight, we probably could have done more since then. Our debates and discussions should also reflect on these very critical aspects of our societal needs that include bringing into the sector those that have previously been marginalised and ensuring that the tools that were created to achieve these goals are put into effect. I strongly believe it is not just a matter of policy and legislation but can also be seen as simply good economics or economic sense. Water, however limited, can be a catalyst for social and economic development. It is a key connector to livelihoods and development.

As many of you will be aware, the Department is stepping up the regulatory regime and focussing on programmes that are aimed at improving the quality and availability of water for various needs. The blue drop, the green drop and monitoring and enforcement initiatives are all part of this process.

We have heard in the past that our water policy and legislation ranks among the best in the world. However, implementation of these policies has been a serious challenge. It is through engagements like this conference that will take us far. There is a clear need for us as a country, including the international community, business sector and all to work in partnerships to ensure that we succeed in implementation. While at it, I recall a colleague once saying something to the effect that "restating the problem several times may remind you of the problem but it will not bring you any closer to the solution".

Indeed in preparing for this presentation, I took notice of the thematic areas covered by the presentations from infrastructure, water efficiency, climate change, water-business relationship, water treatment issues and so on. These are very critical issues to be dealt with at this level. I must confess though that for me personally, it is somewhat daunting to talk to you who very often qualify to be captains of the industry so-to-speak. However, I find solace in the fact that I have been privileged to have not only been part of the water policy development and saw the first edition of the National Water Resources Strategy (NWRS) in 2004, but currently involved with the review of the strategy. As stated in your publication material, "Technology, management, infrastructure development, planning, partnerships, governance, education, engineering and publicity are all required for a comprehensive Sustainable Water Resource plan that involves government, business and consumers.

The current review of the National Water Resources Strategy draws significantly from the engagements the Department has had as part of Water for Growth and Development process with sub-strategies covering aspects of desalination, the so-called water mix, national groundwater strategy, information and technology innovation, and so on. I'm sure this conference will go a long way to inform the Department in its effort to review the strategy and charting our water future. The list of invitees is cross-cutting from national to local government level and water industry from suppliers, users, practitioners and researchers. This bodes well in that it indeed represents a significant part of the sector.

This presentation would not be complete if I do not specifically speak to the issue of education and capacity building in the sector. I have taken note of the fact that one of the targeted participants in this conference is Tertiary Institutions Stakeholders. As someone who has taught at college and university in my past life, and having worked in the scientific services environment, I can perhaps speak on this with some level of authority and better understanding of the situation.

For us to tackle the future challenges in the water sector we need to ensure that capacity is built in various fronts. Some of you may be aware that a few years ago, the Department had to establish a learning academy to develop capacity – the reality is that like many sectors, all the different thematic areas that are covered in this conference for instance require a strong cadre of new and young leaders to take us beyond where we may be today. We need to actively ensure that the critical mass is deliberately and consciously increased as the complexity of the environment we are dealing with increase all the time. This we must do as a matter of course. The significance of this, especially to supply skills to local government cannot be overemphasised. The fact that we are stepping up implementation means that we have to increase the critical mass across all skills levels and requirements. As you may be aware many studies have shown this very critical gap which we must urgently address.

Let me conclude with what I think the Minister would wish – that your deliberations be another milestone, a key contribution to building solutions and support decision making in these very important aspects of our development as a country and continent. We cannot afford to flounder.

I wish you all the success in your deliberations during these two days and look forward to the outcome of the conference. I can assure you that the Department will be following the results very closely.

I thank you."

Postgraduate Training Fellowships for Women Scientists from Sub-Saharan Africa and Least Developed Countries (LDC) at Centres of Excellence in the South.

The Fellowships are offered to women scientists to purse postgraduate research in the following fields of basic sciences: biology, chemistry, mathematics and physics.

This fellowship programme is for female students from Sub-Saharan Africa or Least Developed Countries (LDCs) who wish to pursue postgraduate training leading to a doctorate degree at a centre of excellence in the South outside their own country.

Please read the following information carefully before applying.

- Only women scientists from Sub-Saharan Africa and/or one of the Least Developed Countries can apply;
- Host institutions must be located in a developing country;
- Applications that are incomplete or illegible cannot be considered. Please make sure all the requested enclosures are submitted together with your application;
- Submissions by email or fax cannot be accepted.

The Third World Organization for Women in Science (TWOWS) with funds generously provided by the Department for Research Cooperation (SAREC) of the Swedish International Development Cooperation Agency (Sida), has instituted a fellowship programme for female students from Sub-Saharan Africa and Least Developed Countries (LDCs), who wish to pursue postgraduate training leading to a Ph.D., at centres of excellence in the South (developing countries), outside their own country.

The general purpose of the scheme is to contribute to the emergence of a new generation of women leaders in science and technology, and to promote their effective participation in the scientific and technological development of their countries.

The specific aims of the scheme are:

- To improve access to educational and training opportunities in science and technology for young and talented women graduates from Sub-Saharan Africa and LDCs;
- To increase the scientific productivity and creativity of women scientists in Sub-Saharan Africa and LDCs; and
- To empower a new generation of talented women to assume a leadership role in science and technology and their application to sustainable development.

The host institute where the applicant wishes to pursue her doctorate degree must be in a developing country other than her own.

The applicant must be willing to return to her own country after completion of the fellowship.

Contact Details
Ms. Leena Mungapen
Tel: +39 040 2240-321
Fax: +39 040 2240-689
E-mail: info@twows.org

Georg Forster Research Fellowship for Postdoctoral Researchers

MSc: Rangeland Resource Management post grad from University of Namibia

Submit an application if you are a researcher from abroad with above average qualifications, at the beginning of your academic career and only completed your doctorate in the last four years. A Georg Forster Research Fellowship for postdoctoral researchers allows you to carry out a long-term research project (6–24 months) you have selected yourself in cooperation with an academic host you have selected yourself at a research institution in Germany.

Scientists and scholars from all disciplines from developing and threshold countries (excluding People's Republic of China, India and Turkey) may apply to the Alexander von Humboldt Foundation directly at any time. The research proposal must address issues of significant relevance to the future development of your country of origin and, in this context; promise to facilitate the transfer of knowledge and methods to developing and threshold countries.

The Humboldt Foundation grants up to 60 Georg Forster Research Fellowships for postdoctoral researchers and experienced researchers annually. Short-term study visits, participation in congresses and training courses cannot be financed.

Contact
Phone: (+49) 0228-833-0
Fax: (+49) 0228-833-199
Email: info@avh.de

Upcoming events

Grassland Society of Southern Africa/Grootfontein Agricultural Development Institute Research Skills Workshop
Date: 21-22 September 2010
Venue: Grootfontein Agricultural Development Institute, Middelburg, Eastern Cape
Contact: Freyni du Toit
E mail: admin@grassland.org.za

Bush Encroachment Control Course
Date: 21 September 2010
Venue: Mabula Game Reserve, Bela Bela
Tel: +27 (14) 717 3819

Rehabilitation of Eroded Areas Course
Date: 22 September 2010
Venue: Mabula Game Reserve, Bela Bela
Tel: +27 (14) 717 3819

Cultivated Pastures Course
Date: 7-8 October 2010
Venue: Towoomba Research Station
Tel: +27 (14) 717 3819

KZN Conservation Symposium 2010
Date:19-21 October 2010
Venue: Queen Elizabeth Park, Pietermaritzburg
Contact: Ms Gerda de Jager
Tel: 033 845 1470
E mail: dejager@kznwildlife.com

Control of Exotic Invasive Plants Course
Date: 12 November 2010
Venue: Centre for Wildlife management, Pretoria
Tel: +27 (14) 717 3819

Wild Flower Identification
Date: 26 November 2010
Venue: Pretoria Botanical Garden
Tel: +27 (14) 717 3819

8th European federation for Information technology in Agriculture, Food and the Environment Conference
Date: 11-14 July 2011
Venue: Czech University of Life Sciences Prague, Czech Republic
Contact: Eva Cervenkova
E mail: conference2011@czu.cz

New and resigned members

New members
Anthony Whitbread, CSIRO Sustainable Ecosystems, Farming System Scientist

Christian Mbajiorgu, UNISA, Lecturer.

Duncan MacFadyen, Ernest Oppenheimer and Son (PTY) Ltd.

John Power, Endangered Wildlife Trust, Field Officer

Jurie Human, Anglo Thermal Coal, Rehabilitation Superintendent

Moffat Setshogo, University of Botswana, Senior Lecturer

Percy Sekwadi, DoA Grootfontein, Agricultural Training Officer (Pastures)

Resigned members
Bobby Westfall, ARC, Senior researcher

Eric Mpikeleli, Eastern Cape Department of Agriculture, Principal Scientist

Jeremy Anderson, Development Alternatives Inc.

Richard Hurt, Richard Hurt & Associates, Technical Manager

You are cordially invited to attend the…

KZN CONSERVATION SYMPOSIUM 2010

Presenting the science and practice of nature conservation in KwaZulu-Natal and beyond

DATES: 19-21 October 2010

VENUE: Queen Elizabeth Park, Pietermaritzburg, KwaZulu-Natal
TIMES: Starting 10.00 on 19th October, ending 16.00 on 21th October.

To confirm your attendance and receive more information on the symposium, please REGISTER by 31 August 2010 (using the attached registration form) to:
Ms Gerda de Jager
Tel: 033 845 1470; Fax: 033 845 1498
E-mail: dejager@kznwildlife.com
(please visit the Ezemvelo KZN Wildlife website for updates – www.kznwildlife.com)

PAPER (Oral / Poster) submissions:
To submit a paper or poster for the symposium, please send an abstract to Ms Gerda de Jager (in the format indicated on the following page) by 31 July 2010.

Celebrating the International Year of Biodiversity

Feature

Presidential address: 45th Annual Grassland Society of Southern Africa Congress

M PEEL
Agricultural Research Council, Animal Production Institute
E mail: mikep@arc.agric.za

I attended my first Grasslands Congress in 1987 in what was then South West Africa now Namibia. It was a very different world back then with focus firmly on commercial agriculture and the membership consisting largely of government employees and a smattering of academics. It was essentially a group of people doing excellent work focused on a specific sector of agriculture – the commercial farmer. To determine whether the Society has kept abreast, or not, with changes in the discipline and within societal changes in southern Africa, I undertook an analysis to determine the changing, or not, focus of the journal. Due to time constraints I undertook a cursory survey of journal contributions for four time periods, each spanning five years (1966-70; 1976-80; 1986-90; 1996-2000; 2006-2010).

During the period 1966-70 and 1976-80 there was a predominance of rangeland/veld contributions to the journal (69% and 61% respectively). Contributions from South Africa dominated during this period (91% and 85% respectively) with 7% and 12 % respectively coming from the then Rhodesia (now Zimbabwe). Contributions from the latter country declined as many grassland/rangeland scientists left that country (particularly during the 1980's).

The 1976-80 and 1986-90 period indicated the highest percentage of pasture/forage contributions at just below 40%. Contributions between 1966 and 1990 were, as expected due to our international isolation, predominantly from South Africa (96%) and aimed at the commercial sector (99% - with only 1% aimed at the so called "communal" sector).

The early 1990's heralded the beginning of a new "democratic South Africa". Still not too much changed in terms of the focus of the Society but in 1998 it was decided that a Strategic Plan be set in pace to take the GSSA into the new millennium, a testimony to the foresight of the then leaders within the GSSA.

The proportion of rangeland/ecological contributions to the journal increased sharply during the period 1996-2000 (70%) with a concomitant decline in the proportion of pasture/forage papers. Significantly, papers relating to communal rangelands increased to 22%, a sure sign that the country and indeed our Society was starting to embrace the challenges of our new democracy. In addition, there was an increase in the contribution from the Southern African Development Countries (SADC 8%), other African countries (10%) and overseas (4% - the highest to date in this category) with 79% coming from South Africa.

The continued and increasing dominance of ecological contributions was such that mention is made in the 2002 Strategic Plan document of the possibility of forming an independent 'Pasture' Association. This split was fortunately averted and credit to the membership of the Society for ensuring that the Society remained intact.

The first mention of emerging farmers that I find in the Strategic Plan discussions was made at this time. It was however only at the 2004 Strategic Plan meeting that it was noted that the Society was now functioning in what could be termed a less "friendly" environment and that a new direction was needed if we were not to become a "remnant of the past". The strides taken in the latter regard are reflected in the 2006-101 period with meaningful changes in membership demographics. In addition to the latter,

contributions aimed at the communal sector (and remembering that there is overlap in the relevance of some contributions to both communal and commercial situations) increased to 40%. During this latter period South African contributions make up 69%, SADC 14%, rest of Africa 15%, and overseas 2%, a sign at least of our regional significance. I feel that the decline in pasture contributions to 24% proportionally during this period requires urgent attention.

Returning to demographics, it is clear that the GSSA has come a long way from the days of a largely white, male, commercial agricluture dominated sector – entirely relevant, dare I say, for where our country was at the time and having said that there has never been a racial veto within the Society. Let us therefore take time to pay tribute to these 'men" of foresight who started the GSSA ball rolling some 45 years ago. The evidence I have provided above shows that the Society has been dynamic in embracing change that will ensure its continued relevance. To support this further, a quick survey indicates an increase in female presenters from 26% in 2008 to 31% in 2010 and a female membership of the Society of 19%, an improvement certainly but still, I believe, some way to go! Of some concern is that we have not succeeded in attracting significant. A challenge for the future is therefore to get the "ern" back into southern Africa.

The increased diversity in membership is a real strength but can also provide a great challenge and that is why the core values of the society require constant evaluation to plot the way forward. Issues of collegiality (where we are united in a common purpose and respecting each other's abilities to work toward that purpose), altruism (members put more in than they expect to get out), strong research philosophy (excellence), strong applied links (land users, practitioners), opportunities for young scientists (the Congress – look for mentors), inter-institutional co-operation (the nature of South African scientific organisations means that we often do not have the critical mass within a single organisation to be effective and therefore MUST network with scientists from other institutions to remain relevant and effective – this, I believe is a real strength). Our Society is right up there in terms of the diversity of disciplines our members are drawn from farmers and scientists involved in intensive pasture work to extensive ranches to mining to national parks.

Our journal, The African Journal of Range and Forage Science finds itself in a strong position having now also gained an ISI rating. The increase in submissions from African countries and further abroad are further testimony to the high standard of the journal. Journal submissions must be such that the Society remains relevant and we need to embrace issues relating to: soil and water, their importance in assuring food security and the role they play in mitigating climate change; increased sustainable livestock/herbivore production; fragmentation as it relates to land reform and smallholder/emerging farmer agriculture; genetic improvement of forage grasses and legumes to reduce greenhouse gas emissions, the sustainable management of land, water and genetic resources, while actively addressing the social, political and economic issues that we as members, given the wide range of disciplines within which we work, serve. Our newsletter 'Grassroots' now includes articles of a semi-scientific nature, material that will not be published in a journal format but that must see the 'light of day'.

Backing all of this is an administrator who defies belief. I will mention only one person by name and that is Freyni du Toit who quietly and sometimes not so quietly ensures that the wheels of the GSSA run smoothly. Being a member of Council and now President has been a privilege, a most rewarding time, and I encourage you to stand for Council if you are nominated. I assure you will not be disappointed. Thank you to all Council members and all Society members who have ensured a most enjoyable tenure as President. The atmosphere is truly vibrant and I encourage one and all to continue to actively promote and grow the Society.

Thank you

Is soil disturbance really necessary to ensure the success of bare patch restoration in sandy soils in the Nama Karoo?

Introduction

Rangelands in the Nama Karoo are primarily used for extensive livestock farming with sheep and goats. Poor grazing management is regarded as one of the most important causes of land degradation in South Africa (Hoffman and Ashwell 2001) and has resulted, together with periodic droughts and physical and chemical processes in the soil, in vast areas of the Nama Karoo being totally denuded of any vegetation (Cowling et al. 1986, Kellner and Bosch 1992). This has a large impact on the availability of fodder for livestock as well as on the livelihoods of the people making a living in the area from extensive livestock farming.

Often the veld degrades to a point beyond which vegetation cover, plant density and species composition can recover, despite removal of the animals and their grazing impact (Curtin 2002, Snyman 2003, van den Berg and Kellner 2005). In such cases restoration interventions become necessary to assist with the re-establishment of vegetation.

The general view is that mechanical disturbance of the soil is necessary because of the clayey soils of bare patches that form an impenetrable crust that leads to a high degree of soil compaction. Although one does not find that kind of compaction in sandy soils, there is a degree of crust formation on the bare soil that influences germination in a negative way (Van der Merwe and Kellner 1999).

Objective

The objective of this study was to test the hypothesis that, in the long term, soil disturbance is not the only intervention that will allow for the successful restoration of vegetation on sandy soils in the Nama Karoo.

Materials and Methods

Study area

The study was conducted in the bossieveld of the Gamka Karoo (Mucina and Rutherford 2006) on a bare patch of approximately 1 ha on the farm Montana in the Beaufort West district, Western Cape Province. The area receives an average annual rainfall of 215 mm and the soils are sandy-loam and nutrient-rich, but with a low organic carbon content of 0.24%. A detailed description of the site is given in Visser et al. (2004).

Treatments

The study started in November 1999 and 6 treatments with 3 replications were applied, following a randomized block design. Each treatment plot was 12x12 m in size. The treatments were Seeding (S), Seeding+Brush-packing (SB), Tilling (T), Tilling+Seeding (TS) and Tilling+Seeding+Brush-packing (TSB) and a control (C).

The soils in the tilled plots were cultivated once to a depth of 150-200 mm using a tine implement. The rows were about 150-200 mm apart. Branches from nearby *Acacia karroo* trees were cut and used in the brush-packing treatments. Seeds of five indigenous species were sown-in in the seeded plots at a seeding rate of 15kg.ha^{-1}. A seeding rate of 3-5 kg.ha^{-1} is normally recommended (Esler and Kellner 2001), but this high seeding rate was used to ensure that available seed is not the limiting factor. The species included in the seed mixture were *Cenchrus ciliaris, Chaetobromus dregeanus, Atriplex semibaccata, Pteronia membranacea* and *Tripteris sinuata.* The experimental area was fenced off to exclude large herbivores but smaller herbivores such as hares could freely access the site for the study period.

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Vegetation surveys

Vegetation surveys were done annually in December from 2000 until 2004 and again in February 2010. For each plot all plants encountered within each of 10 randomly located 1x2 m quadrants were counted and identified. The growth stage of each plant, which is seedling, reproductive or vegetative was also recorded. The presence or absence of the different growth stages is an indication of the success of establishment of a particular species (Brown 1957).

Results and Discussion

The number of species present and the plant density increased drastically from 2000 to 2010. The number of species present increased from a maximum of 14 species in the T and TSB-treatments in 2000 to 31 species in the SB-treatment and 27 species in the TSB treatment respectively in 2010. The plant density increased from <6 plants/m-2 to > 60 plants.m^{-2} during the same period (Figure 1a and b).

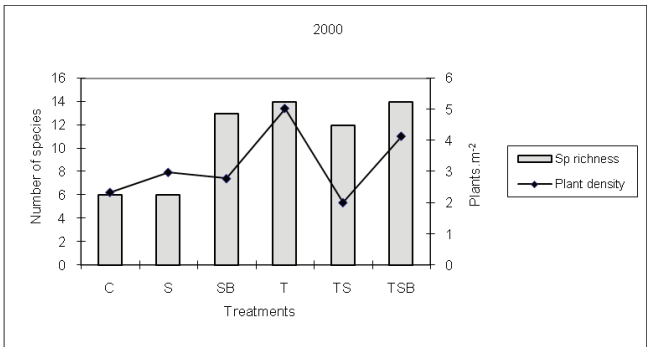

Figure 1a

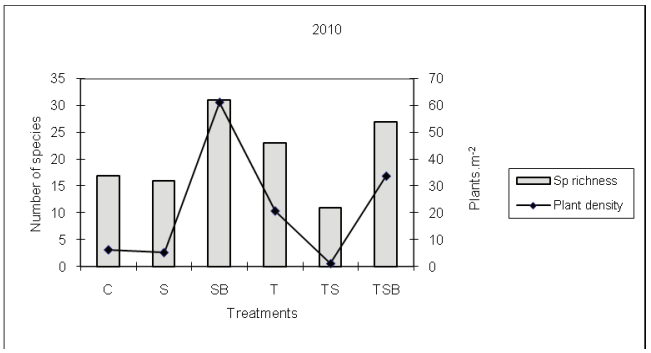

Figure 1b

Figure 1: Number of species and plant density (plants.m-2) in the different treatments in (a) 2000 and (b) 2010 at Montana.

Only three of the sown-in species were present in the treatments, namely *Atriplex semibaccata, Cenchrus ciliaris* and *Chaetobromus dregeanus. Cenchrus ciliaris* was the most common species and was found in all the treatments except the Seeding only (S) treatment. *Cenchrus ciliaris* is a summer-growing grass species that prefers to grow in sandy soil, explaining its dominance (van Oudtshoorn 1999). Other species present, that are readily grazed, includes *Pentzia incana, Felicia muricata* and *Eragrostis lehmanniana* (only in SB treatment), but there were still mainly pioneer species present and accounting for the largest numbers, namely *A adscencionis, A lindleyi* and *C virgata.*

Picture 1: Nelmarie

The total plant density in the SB–treatment in 2010 was significantly more than in all the other treatments except TSB ($F^{4.99}$; p=0.015). The increase in total plant density from 2000 – 2010 ($F^{4.64}$; p=0.018) and from 2004 to 2010 ($F^{4.77}$; p=0.017) was significantly more in the SB-treatment than the rest, except for the TSB-treatment. The total plant density showed significant time x treatment interactions, with significantly higher plant density in the SB-treatment in 2010 than all the other treatments and years ($F^{5.15}$; p=0.0005) (Figure 2).

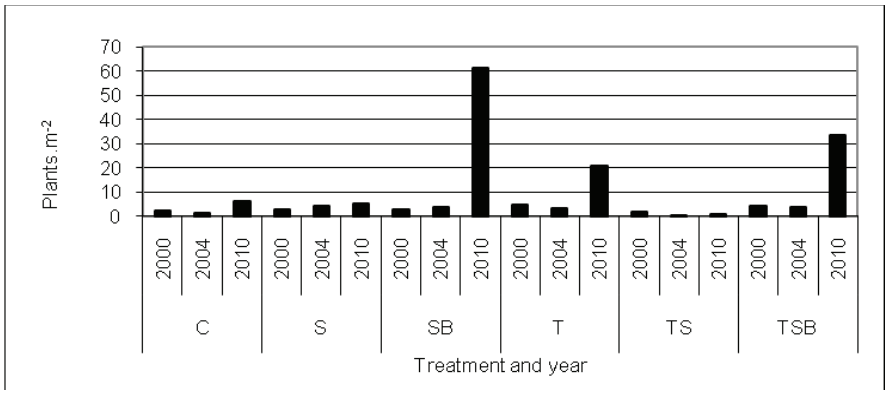

Figure 2: Total plant density (plants.m^{-2}) in the different treatments in 2000, 2004 and 2010 at Montana.

It is evident that there were a high number of seedlings present in 2010, especially in the SB and TSB treatments (Figure 3). More than half of the total number of individuals present was seedlings. This can be ascribed to rainfall received in the area about two weeks before the surveys were done. The other

treatments, except T, did not have a high number of seedlings with less than 5 plants/m^{-2}. There was no significant difference between treatments in 2010, but when comparing the number of seedlings present in 2010 with the other years, there were significantly more seedlings in 2010 than in the other years ($F^{34.44}$; $p<0.0001$). There were, however, no significant differences between treatments.

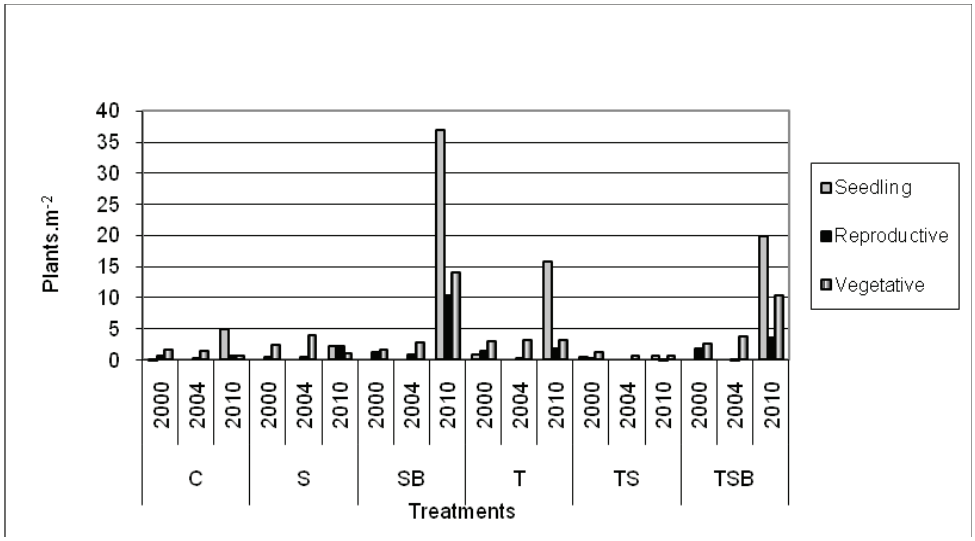

Figure 3: The plant density (plants.m^{-2}) of the different growth stages in the different treatments in 2000, 2004 and 2010 at Montana.

The same were found for the Reproductive and Vegetative stages. There were significantly more plants in flower or seed in 2010 than in the other years ($F^{12.34}$; $p=0.0002$), with the highest number of individuals in the SB treatment. The differences between the treatments were however not significant. It was the same for the plants in a vegetative stage ($F^{31.91}$; $p<0.0001$). The SB and TSB treatments have high numbers of all three growth stages present, which is a sign of success. According to Wiedemann and Cross (2000) the restoration effort can be seen as a success when > 5 plants.m^{-2} have established.

Seeding+Brush-packing and TSB-treatments were the most successful treatments ten years after the initial work was done. No grazing took place, except for small game that could get through the fence and there were some signs of grazing. The success of these two treatments in the longer term

is mainly because of brush-packing. This treatment provides shade that decreases topsoil temperatures which can reach temperatures of 65°C on the bare areas (Snyman 2003). It traps soil, plant litter and seed (Milton 1995) and reduce water run-off and wind and water erosion (Ludwig and Tongway 1996; Brady and Weil 1999), which, together, resulted in the highest plant density and highest species richness in the SB treatment.

Cost-Benefit:
From the costs of the different treatments, it is obvious that brush-packing is very expensive at R802.ha-1. This, however, depends on the availability of brush materials and distance from the restoration site (Visser *et al.* 2004), which was the reason for the high cost in this study's case. In this case it seems that tilling alone would be more efficient than TS and TSB treatments due to its lower input costs, but sometimes one does not have the implements for tilling and branches are readily available, and brush-packing is over the longer term more effective than tilling alone.

Conclusion
From the data it is evident that the hypothesis can be accepted. In the long term, soil disturbance (tillage) is not the only intervention that will allow for the successful restoration of vegetation on denuded sandy soils in the Nama Karoo. Brush packing that provides shade, protects the plants from grazing and provides organic matter, resulted in the highest plant density and highest species richness in the Seeding+Brush-packing treatment. Although brush-packing can be an expensive treatment, if the branches are not readily available, it is very useful in nature reserves and game farms to keep the animals out of the area being restored, especially where one does not want to camp off a site for aesthetic reasons.

Since it is an arid area, rainfall is the major limiting factor and can influence the success of any restoration or rehabilitation project and post-treatment management is critical to prevent the area from becoming bare again.

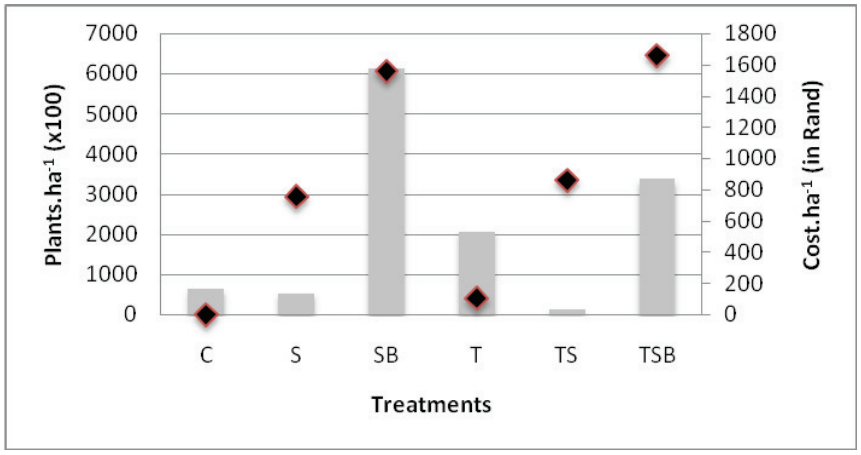

Figure 4: Comparison of plants established.ha^{-1} in 2010 and the Cost/ha^{-1} for the different treatments at Montana. (Costs/ha adapted from Esler and Kellner (2001) and Witbooi (2002).

References

Brady NC and Weil RR 1999. The nature and properties of soils (12th Edn). New Jersey: Prentice Hall. 881 pp.

Brown D 1957. Methods of surveying and measuring vegetation with a chapter on the theory of sampling. Farnham Royal, Bucks: Commonwealth Agricultural Bureaux. 223 pp.

Cowling RM, Roux PW and Pieterse AJH 1986. The karoo biome: a preliminary synthesis. Part 1 – physical environment. South African National Scientific Programmes Report no 124. 115 pp.

Curtin CG 2002. Livestock Grazing, Rest, and Restoration in Arid Landscapes. Conservation Biology 16: 840-842.

Esler KJ and Kellner K 2001. Resurrecting degraded Karoo veld. Farmer's Weekly, March 9, pp. 24-26.

Hoffman MT and Ashwell A 2001. Nature divided: Land degradation in South Africa. University of Cape Town, Cape Town, South Africa. 168 pp.

Kellner K and Bosch OJH 1992. Influence of patch formation in determining the stocking rate for southern African grasslands. Journal of Arid Environments, 22: 99-105.

Ludwig JA and Tongway DJ 1996. Rehabilitation of semiarid landscapes in Australia. II. Restoring vegetation patches. Restoration Ecology, 4: 398-406.

Milton SJ 1995. Spatial and temporal patterns in the emergence and survival of seedlings in arid Karoo shrubland. Journal of Applied Ecology, 32: 145-156.

Mucina L and Rutherford MC (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria. 807 pp.

Snyman HA 2003. Revegetation of bare patches in a semi-arid rangeland of South Africa: an evaluation of various techniques. Journal of Arid Environments 55: 417-432.

Van den Berg L and Kellner K 2005. Restoring degraded patches in a semi-arid rangeland of South Africa. Journal of Arid Environments 61: 497-511.

Van der Merwe JPA and Kellner K 1999. Soil disturbance and increase in species diversity during rehabilitation of degraded arid rangelands. Journal of Arid Environments. 41: 323-333.

Van Oudtshoorn F 1999. Guide to Grasses of Southern Africa. Pretoria: Briza Publications. 288 pp.

Visser N, Botha JC and Hardy MB 2004. Re-establishing vegetation on bare patches in the Nama Karoo, South Africa. Journal of Arid Environments 57: 15-37.

Wiedemann HT and Cross BT 2000. Disk chain effects on seeded grass establishment. Journal of Range Management, 53: 62-67.

Witbooi, B.M. (2002). Potential of selected Karoo plants species: for rehabilitation of old fields. MSc-thesis, Stellenbosch: University of Stellenbosch. 92 pp.

Feature

Fire-mediated succession and reversion of woody vegetation in the KwaZulu-Natal Drakensberg, South Africa.

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Introduction

The Grassland Biome is conspicuous for its near absence of tree cover. This fact makes it anomalous to Whittaker's (1975) predictions as many grasslands are found in regions with sufficient mean annual precipitation (MAP) for trees to be dominant or at least present (Bucini and Hanan 2007, Bond 2008). Trees, which are usually more competitive than grasses are generally confined to stream banks or ridges in grasslands (Hillard and Burtt 1987, O'Connor and Bredenkamp 1997, Tainton 1999). A widely proposed explanation is that fire acts as a top-down driver that maintains this vegetation structure and composition (Adcock 1990, Titshall *et al.* 2000, van Wilgen et al. 2003, Bond and Keeley 2005, Bond 2008), which is further constrained by the bottom-up agents of climate, geology, soil depth and topography (Odum 1983, Titshall et al. 2000).

An experimental catchment (CIX) was setup at Cathedral Peak in the KwaZulu-Natal Drakensberg in 1944 in order to test the extent to which fire is responsible for excluding woody vegetation from montane grasslands (de Villiers 1970). This area is situated at the interface of the Northern Drakensberg Highland Grassland and uKhahlamba Basalt Grassland vegetation types at an mean altitude of 1903m (Granger 1976), "supporting mainly short, sour grasslands, rich in forbs" (Mucina and Rutherford 2006). Three surveys have been conducted (Killick 1963, Granger 1976, Adcock 1990) at CIX, documenting the vegetation changes that have resulted from partial fire preclusion, since the time of its establishment. Thirteen fires have swept through CIX since 1944, with five fires taking place within the first 42 years and eight fires in the 21 years thereafter up until 2007 (EKZNW Fire Records; Pers. Obs.TG O' Connor, Rowe-Rowe, 1995). The most recent fire, in 2007, provides an opportunity to investigate the role of fire in transforming already established woody communities by comparing burnt, coppiced and unburnt individuals.

Results

Notwithstanding these infrequent fires, a steady increase in woody vegetation is observed, with an increase from almost zero in 1944 to 15 089 woody individuals in 590 25m^2 plots in 2009/10. *Leucosidea sericea* and *Erica evansii (Philippia evansii)* are the two dominant woody species, constituting 17.6% and 36% of the total number of woody individuals sampled in 2009/10 respectively. *Leucosidea sericea* is a re-sprouter showing almost no total mortality after a fire, but rather coppices after a burn (figure 1). *Erica evansii* is a re-seeder with near total mortality of all burnt individuals (Figure 1). *Leucosidea sericea* shows a large number of mature individuals both pre- and post-fire with no major changes in size classes (Figures 2a and 2b). By contrast, *E. evansii* shows a dissimilar size class distribution pre- and post-fire with a shift from mature individuals to a seedling cohort respectively (Figures 2a and 2b). The "bottom-up" selective pressure of aspect has shaped the distribution of *L. sericea* and *E. evansii. Leucosidea sericea* is more common on the north-facing slopes than on the south-facing slopes whilst *E. evansii* showed an opposite pattern (Figures 3a and 3b).

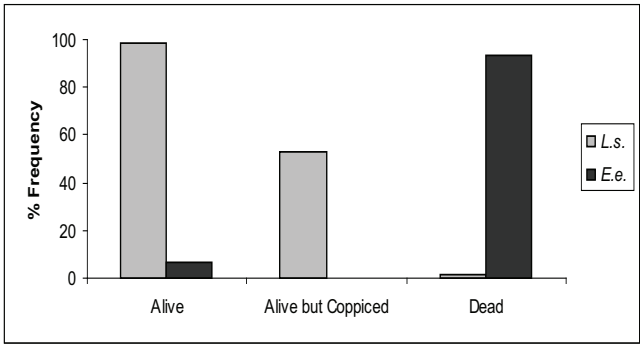

Figure 1: The response to previous fires in CIX of *L. sericea* and *E. evansii.*

Figure 2a

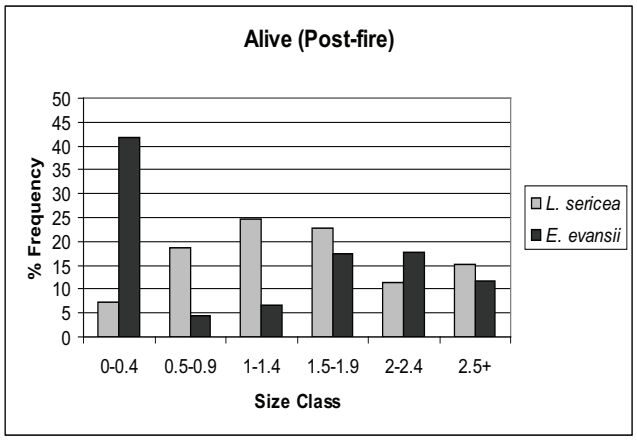

Figure 2b

Figure 2a and 2b: The changes in size classes of *L. sericea* and *E. evansii* in response to the 2007 fire.

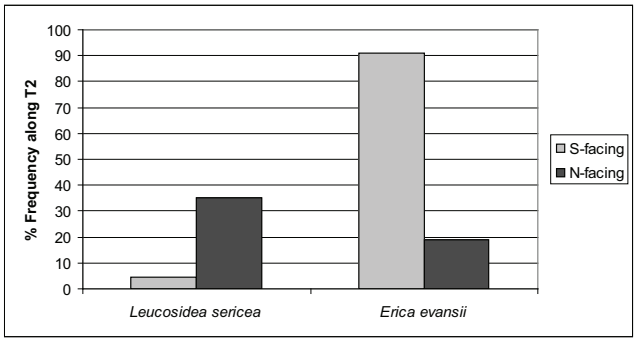

Figure 3a

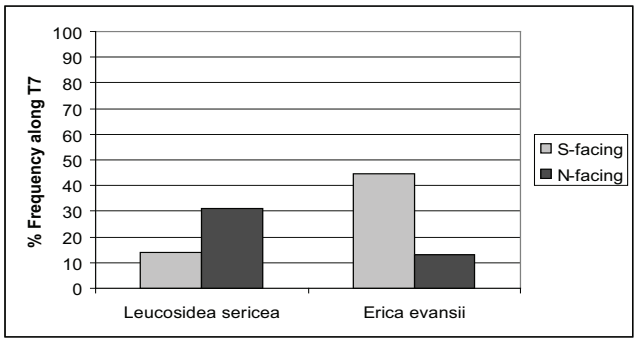

Figure 3b

Figure 3: The frequency of *L. sericea* and *E. evansii* along north- and south-facing slopes along Transect 2 (3a) and 7 (3b).

Forest pioneer and forest species (such as *Buddleja salviifolia, Diospyros whyteana, Halleria lucida, Ilex mitis, Leucosidea sericea, Myrsine africana, Olinia emarginata, Pittosporum viridiflorum, Podocarpus latifolius, Scolopia mundii*) have established on moist areas of the catchment that protected from fire. The patches are shifting toward Northern Afrotemperate Forest (Mucina and Rutherford 2006).

Conclusion

CIX showed an overall increase of woody vegetation as a result of partial fire preclusion over 66 years. The two dominant woody species are *L. sericea* and *E. evansii.* These species have contrasting life history strategies, in being a re-sprouter and re-seeder respectively. As a result, their spatial and demographic distributions differ within the catchment. Forest precursor and forest species have established in the moist areas and areas relatively secluded from fire. CIX is transforming from a Northern Drakensberg Highland Grassland/uKhahlamaba Basalt Grassland to a Drakensberg-Amathole Afromontane Fynbos and Northern Afrotemperate Forest vegetation type (Mucina and Rutherford 2006), each expressed in different areas of the catchment, as a result of partial fire preclusion.

References

Adock K 1990. Vegetation Changes since the Withdrawal of Fire from Catchment IX, Cathedral Peak, Natal Drakensberg, M.Sc. Thesis.

Bond WJ and Keeley JE 2005. Fire as a global 'herbivore': the ecology and evolution of flammable ecosystems. TRENDS in Ecology and Evolution 20 No.7.

Bond WJ 2008. What Limits Trees in C4 Grasslands and Savannas? Annual Review of Ecology, Evolution, and Systematics 39:641-659.

Bucini G and Hanan NP 2007. A continental-scale analysis of tree cover in African savannas. Global Ecology and Biogeography 16:593–605.

de Villiers AM 1970. The early history of the Cathedral Peak Research Station. South African Forestry Journal. 72.

EKZNW Fire Records (obtained from Midmar offices in 2010).

Granger J E 1976. The Vegetation Changes, some related factors and changes in the water balance following 20 years of fire exclusion in the catchment IX; Cathedral Peak Forestry Research Station. Ph.D. Thesis. University of Natal.

Hillard OM and Burtt BL 1987. The Botany of the Southern Natal Drakensberg. National Botanic Gardens. CTP Book Printers. Cape.

Killick DJ 1963. An Account of the Plant Ecology of the Cathedral Peak Area of the Natal Drakensberg. Botanical Survey of South Africa Memoir No. 34. Botanical Research Institue. Department of Agricultural Technical Services. Government Printer, Pretoria.

Mucina L and Rutherford M C (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

O'Connor TG and Bredenkamp GJ 1997. Grassland. In: RM Cowling, DM Richardson and SM Pierce (eds) Vegetation of Southern Africa, pp xx-xx, Cambridge University Press, Cambridge.

Odum PE 1983. Basic Ecology. Holt-Saunders International Edition. CBS Publishing. Japan.

Rowe-Rowe DT 1995. Small-mammal recolonisation of a fire-exclusion catchment after unscheduled burning. South African Journal of Wildlife Research 25: 133-137.

Tainton NM1999. Veld Management in South Africa. University of Natal Press. Pietermaritzburg.

Titshall LW, O' Connor TG and Morris CD. 2000. Effect of long-term exclusion of fire and herbivory on the soils and vegetation of sour grassland. African Journal of Range & Forage Science 171: 70-80.

Van Wilgen B W, Trollope W S W, Biggs H C, Potgieter A L F and Brockett B. H. 2003. Fire as a driver of ecosystem variability. Pages 149–170 in J. T. Du Toit, K. H. Rogers, and H. C. Biggs, eds. The Kruger experience: ecology and management of savanna heterogeneity. Island, Washington, DC.

Feature

Report on the clearing trial of *Pteronia incana* (bluebush) and *Elytroppappus rhinocerotis* (renosterbos) in Mgwalana catchment, Ngqushwa District, Eastern Cape Province: rehabilitating degraded rangeland

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Introduction

Invasion of blue bush (*Pteronia incana*) and *renosterbos* (*Elytropappus rhinocerotis*) continues in the rangeland of the Mgwalana catchment of the Ngqushwa district (formerly Peddie) of the Eastern Cape (Kakembo et al. 2006, Kakembo et al. 2007). These species, both indigenous to the Nama karoo region of South Africa, successfully invade natural grassland and thicket. Both species have been recorded in un-disturbed rangelands across the Great Fish river and Keiskamma river valleys, but are known to increase and become dominant in the absence of fire or when excessive soil disturbance has occurred. Disturbance of the soil surface by excessive trampling, cultivation (Kakembo 2001) or subterranean mammal activity (e.g. termites or mole rats) creates gaps which can be colonized by seedlings.

Control of both species on free-hold rangeland with adequate infra-structure can be affected using fire. However, communal rangelands do not lend themselves to the use of fire, as there are no options for the control of grazing after burning, and little opportunity to build up fuel loads which would enable a burn to be applied. This is principally due to the absence of livestock control systems (adequately fenced and gated camps, water provision) in areas under communal tenure. The project aims at evaluating the cost effectiveness of a range of manual clearing techniques which may be used as an alternative control measure. In order to evaluate the effectiveness and cost of clearing these species, a project was initiated to experimentally clear a number of trial areas as part of the National Department of Agriculture's Landcare Programme. Five sites of known bluebush and renosterbos infestation were identified from high resolution near infra-red (NIR) photography in the Mgwalana catchment. In four sites, intensive manual clearing was carried out to assess the cost and efficacy of three clearing techniques. At the fifth site, a landscape-scale clearing action occurred to measure the impact of clearing on the MODIS leaf area index (LAI). The sites varied in the density of infestation.

Aim

The aim of this trial was to evaluate the cost and effectiveness of manual clearing of blue bush (lavender bush) (*Pteronia incana*) and renosterbos (*Elytropappus rhinocerotis*) on the communal rangelands of the Ngqushwa district.

Methods

Three physical clearing treatments were applied at each of the intensive clearing site in March 2003. Treatments were applied to three randomly selected sub-plots of the five quadrangular sub-plots of approximately 3ha. (100mx300m). One sub-plot was used as a control, and the fifth was used as the area to be packed with dead material and burned

at a later stage. A burn was applied to these sites on 17 September 2003. The three physical clearing treatments were applied during a single operation in March 2003. The first used a specially designed instrument or "dicker" (manufactured by Fabcomp, King Williams Town), which pulls the rooted plant out of the ground. The second used commercial lopping shears to cut the plant off at the base, and the third employed a "slasher" to chop the plant off.

At all sites, the density of large plants (>0.5m in height), was determined using the point-centred quarter (PCQ) technique. The boundaries of each treatment were determined from the aerial photographs, and marked in the field using a GPS. Each team was allocated an equal amount of cash to complete the three treatments and pack the burn plot. The limiting factor to completing the 3 ha was the finances allocated to each team. Teams were encouraged to complete the full 3ha, but at the highest densities of infestation this was not possible within the financial allocation. At the completion of the 22 day working period, the area completed by each team was recorded using a GPS and the area calculated using a GIS package.

MODIS LAI product (Collection 4)

We acquired 8 years of the MODIS 8-day 1 km Collection 4 (MOD15A2) composite LAI/FPAR product (Knyazikhin et al*.* 1998) for the period March 2000 to December 2007 from the NASA Distributed Active Archive Centre. The data were extracted from the archive using the MODIS re-projection tool (HegTool) and imported into IDRISI (Version I32.11, Clark Labs) image processing package to create an 8-year data stack. The geo-codes for the centre of site 5 and the two control sites (village, un-cleared and grassland) were entered into the GIS and 8-day LAI values for each site were extracted.

Photo: Tony Palmer. The dicker instrument being operated by one of the ladies from the village of Nyaniso,

Results

The results of the costs associated with the various treatments are presented (Table 1).

Treatment	Site 1	Density		Team Celetyuma		Total person days	
	Area (ha)		days worked	Area/day	Team size		Cost per ha.
Dicker	1.99441	High	38	0.052484	3	114	R 2,958.86
Lopper	2.359212	Low	7	0.33703	3	21	R 460.77
Slasher	2.971566	Low	6	0.495261	3	18	R 313.56
Pack	1.944959		17	0.114409	1	17	R 452.45
Control	3						
					Total	170	R 51.76
	Site 2			Team Mgwalana			
	Area (ha)		days worked	Area/day	Team size		Cost per ha.
Dicker	0.985735	High	18	0.054763	3	54	R 2,398.39
Lopper	0.716058	High	21	0.034098	3	63	R 3,851.93
Slasher	0.78571	High	21	0.037415	3	63	R 3,510.47
Pack	0.135282		21	0.006442	1	21	R 6,796.21
Control	0.764488						
					Total	201	R 43.78
	Site 3			Team Mgwalana:Youth			
	Area (ha)		days worked	Area/day	Team size		Cost per ha.
Dicker	0.322315	High	22	0.014651	3	66	R 8,190.74
Lopper	0.547779	High	22	0.024899	3	66	R 4,819.46
Slasher	0.649184	High	22	0.029508	3	66	R 4,066.65
Pack	0.62375		22	0.028352	1	22	R 1,410.82
Control	0.759029						
					Total	220	R 40.00
	Site 4			Team:Amahlubi			
	Area (ha)		days worked	Area/day	Team size		Cost per ha.
Dicker	2.429	Moderate	11	0.220818	3	33	R 934.03
Lopper	2.409477	Moderate	14	0.172105	3	42	R 1,198.39
Slasher	2.870326	Moderate	13	0.220794	3	39	R 934.13
Pack	0.52434		14	0.037453	1	14	R 1,835.64
Control	2.575065						
					Total	128	R 68.75

Near infra-red imagery was recorded in October 2004 over 2 sites using the Kodak DCS420 infra-red digital camera. Eighteen months after clearing (October 2004) there were some visible differences in the near infra red reflectance and NDVI's (Figure 1) between treatments, but these were not all significant and their interpretation must be dealt with cautiously. The dicker treatment on Site 3 had a higher infra-red signal and NDVI than the other treatments (Figure 1).

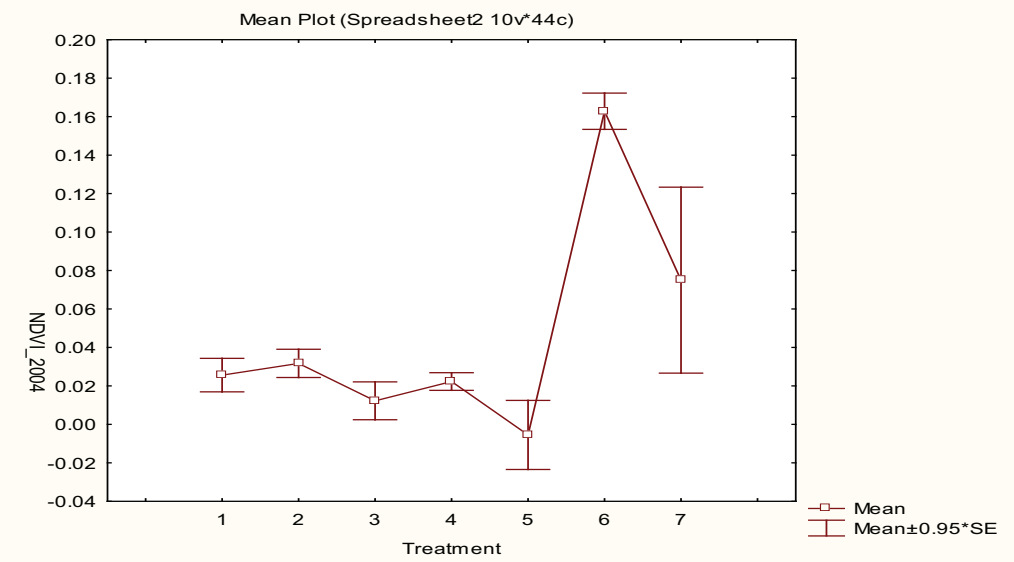

Figure 1. NDVI values for the 4 treatments, control, adjacent woody thicket and good condition grassland in October 2004. NDVI was calculated from the NIR and red bands of the Kodak DCS420 digital camera. 1=Dicker, 2=Control, 3=Lopper, 4=Slasher, 5=Burned (Falkia repens absent)/ bare soil, 6=Riparian thicket (woody species), 7=Good grassland, un-invaded by Pteronia incana.

This pattern was not repeated at site 2. This may be due to the stimulation of the soil microbial activity after complete extraction of plants by the dicker, resulting in the release of nutrients and greater active green growth. During October 2004, these burn scars were covered by a single herbaceous species, Falkia repens. This was not a desirable species, and as there was only one herbaceous species present, this was likely to die off during the dry season, leaving no ground cover. The NDVI of woody shrubs and healthy grassland were significantly higher than Pteronia incana stands and clearing treatments (Figure 2).

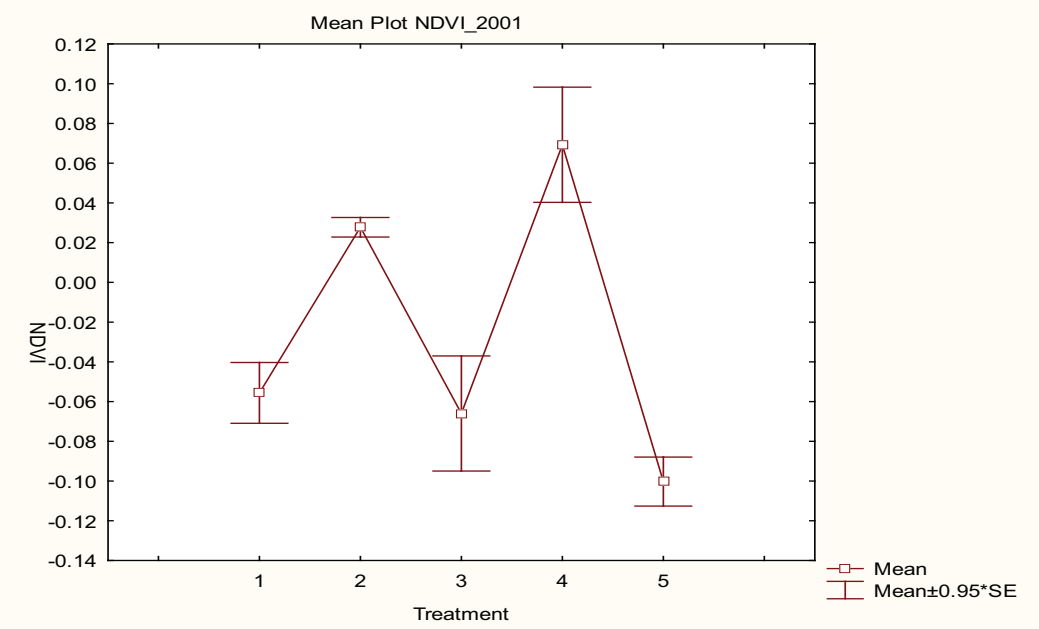

Figure 2. The mean and standard errors of the DCS 420 NDVI's for the five treatments. The riparian zone (Treatment 4), with its woody component and high perennial grass cover has the highest NDVI, followed by the control grassland in good condition (Treatment 2). 1= sparse grassland with Pteronia incana, 2=grassland with Elytropappas rhinocoerotis (control), 3=Pteronia incana shrubland, 4=riparian thicket, 5=sparse shrubland on shallow rocky soil.

During a site visit in June 2007, it was clear that there was an increase cover of bluebush from those seedlings that had not been extracted during the clearing operation. The clearing techniques only removed large plants and left many seedlings and seeds. Opening up of the gap created space for the seedlings to grow and they have been growing vigorously. I expect a higher NDVI for these sites during 2008, as the emerging bluebush seedlings are in an active growth phase. Further assessment was planned during 2008, with the possible purchase of more ASTER imagery. Using a supervised classification procedure on the ASTER data, we defined the area invaded by high densities of *Pteronia incana* to be approximately 27000ha. The image did not cover the whole of Ngqushwa, and therefore represents an under-estimate of the extent of the problem. A time series plot of the 8-day MODIS leaf area index (LAI) of the cleared area and the three control sites was provided for the period April 2000 to December 2007.

Prior to the clearing event in November 2003, the *Pteronia* infested site (Site 5) had a lower LAI than

the grassland site and a higher NDVI than the village. This matched well with the expectation for the site, as the 1km MODIS pixel included some good condition grassland. After clearing in November 2003, there was a decline in the LAI for that site for the whole of 2004 compared with the control-village and control grassland where, no treatment took place. This agrees with the reduction in leaf area that would have accompanied the clearing of 30ha of *P. incana* at site 5. The decline in MODIS LAI was significant at the end of 2004, but in the growing season of 2005 the MODIS LAI had increased to a value midway between the control-village and control grassland. This was an indication of the extent of the re-growth of P. incana after the treatment. The very low LAI values of the treated-site (Site 5), control-village and control- *P. incana* relative to the control-grassland are indicative of extremely low production potential of the invaded grasslands. In order to quantify the possible impact of this difference on grassland production, I integrated the area under the two time series plots for the cleared and grassland sites.

The leaf area index of the undisturbed grassland in the growing season was significantly higher than that of the degraded rangeland at the other three sites (village, cleared and control-*P. incana*). This difference can be attributed to the lower water use efficiency of the senescent stands of P. incana and the effectiveness of grassland in using rainfall to capture carbon. A simple integration of the area under the curve in a normal year (e.g. 2004) reveals that the annual LAI of the grassland exceeds that of the degraded *P. incana* by 213%. In addition, *P. incana* was totally un-available to livestock, so this figure could be inflated by perhaps as much as another 200%, making the production of the grassland nearly 5 times greater than that of the degraded rangeland.

Conclusion

The project provided an indication of the approximate labour cost of clearing varying densities of bluebush infestation. Under very dense conditions, labour costs per hectare cleared were extremely high (Table 1). These densities did not prevail at consistent levels throughout the landscape, and an approach was recommended where groups are invited to quote on clearing large, previously measured areas. Using this approach, an area of 30ha was cleared during November 2003. This area (Figure 4), comprising a large proportion of high density infestation, was cleared at a cost of R1000 per ha. This represents an example of how the results of the clearing trials can be applied to large scale clearing and rehabilitation of rangeland. Results on the kill rate of the three clearing techniques showed that loppers and slashers did not achieve a significant kill rate (<5%). Dickers achieve a high kill rate (100%) of adult plants but there was a substantial seedling re-growth. Follow up is required. The burns were too hot, caused soil scorching and were colonized by a single species. This was not a desirable state and hot burning (scorching) should be avoided at all costs. However a more appropriate burning programme could be considered if a rest can be guaranteed after the burn. This would have to include the cost of fencing to exclude all herbivores for a lengthy period (6-12 months) before and after the burn.

References

Kakembo V, 2001. Trends in Vegetation Degradation in Relation to Land Tenure, Rainfall, and Population Changes in Peddie District, Eastern Cape, South Africa Environmental Management Vol. 28, No. 1, pp. 39–46.

Kakembo V, Palmer AR, Rowntree K. 2006. The use of high resolution digital imagery to characterize the distribution of *Pteronia incana* invaser species in Ngqushwa (formerly Peddie) District, Eastern Cape, South Africa. International Journal of Remote Sensing 27: 2735-2752.

Kakembo V, Rowntree, K and Palmer AR 2007. Topographic controls on the invasion of *Pteronia incana* (Blue bush) onto hillslopes in Ngqushwa (formerly Peddie) district, Eastern Cape, South Africa. Catena 70 (2007) 185–199.

Knyazikhin Y, J. V. Martonchik, R. B. Myneni, D. J. Diner, and S. W. Running. 1998. Synergistic algorithm for estimating vegetation canopy leaf area index and fraction of absorbed photosynthetically active radiation from MODIS and MISR data. Journal of Geophysical Research-Atmospheres 103:32257-32275.

Impact of land management on water cycle in the bushveld of Zimbabwe: A collaborative southern African initiative

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Introduction

Holistic Management is a management framework developed by Allan Savory that has been used to restore degraded water catchments and/or to enhance their productivity. In this instance, livestock as the main tool, through holistic planned grazing, are concentrated at high density to induce heavy livestock impact over a limited spatial and temporal scale to get desired outcomes. These outcomes include improved forage production, increased ground water resources, and improved stream flow and water quality. Although the scientific basis upon which Holistic Management is based is well established, there is minimal scientific data supporting the claimed results of such management. The ability of Holistic Management to achieve these ecosystem services has also not been adequately compared to other conventional livestock management approaches other than in trials conducted in the 1970's in what was then Rhodesia. Members of the ARC-API recently visited Dimbangombe Ranch near Victoria Falls in Zimbabwe to discuss Savory's approach to resource management and to prepare a proposal to monitor the outcomes thereof.

Historically, rangelands have been managed largely for livestock production to the exclusion of many other ecosystem goods and services. This has led to a strong focus on livestock performance at the expense of other ecosystem services such as enhanced biodiversity and water conservation. The management of catchments is critical to forage production and conservation of water resources. The living requirements of wild and domestic animals include food, water and cover but herbivores differ in their dependence on surface water. The spatial and temporal distribution of water, therefore, plays a major role in determining the distribution of herbivores and by extension the condition of the soils and vegetation.

This study will investigate the use of water, soil and vegetation indicators as a decision making tool for assessing the success (or not) of various management interventions on selected critical elements within the water cycle, soil and vegetation layers on Dimbangombe (cattle and game) and surrounding areas that include a cattle and game operation, game only (hunting), a communal rangeland where Holistic Management is being introduced and a national park (Victoria Falls National Park). All the areas are dominated by basalt derived soils. The study will also investigate two land uses on granite soils, a communal rangeland introducing Holistic Management and a national park (Hwange National Park).

Feature

Most cited papers from Proceedings of the Grassland Society of Southern Africa, Journal of Grassland Society of Southern Africa, and African Journal of Range and Forage Science from 1979-2008

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To determine the most frequently cited papers which were published in the Proceedings of the *Grassland Society of Southern Africa (1979-1983), Journal of the Grassland Society of Southern Africa (1984-1992),* and the *African Journal of Range & Forage Science (1993-2009),* a "cited reference search" was conducted using Thompson Reuters's Web of Science®. As neither the Proceedings of the *Grassland Society of Southern Africa,* nor the *Journal of the Grassland Society of Southern Africa* were Thompson Reuters's ISI accredited journals, therefore citations from this Journal do not appear in the *Science Citation Index.* From 2008 the *African Journal of Range and Forage Science* was ISI accredited, and so from Volume No. 25, these will appear in the *Journal Citation Reports® (JCR)*, and *Science Citation Index Expanded™.* The journals first impact factor will be included in the 2010 JCR, which will be published in the second quarter of 2011.

McClaren (2000) conducted an exercise, published in the Journal of Range Management to find the most important papers in Rangeland Ecology and Management. For this he used School of Biological Science's graduate students at University of Arizona, Tucson. Using their selection criteria, the two most important papers published in the Journal of Range Management were: 1) Dyksterhuis (1949), 2) Westoby et al. (1989). Both are seminal Rangeland Ecology and Management papers, which using Google™ Scholar, for example, Westoby et al. (1989) has been cited at least 953 times. The list of most important papers in McClaren's (2000) paper ran to 20 papers.

The method adopted in this case, was that searches (using Thomson Reuters Web of Science® abbreviations for these three journals e.g. AFR J RANGE FORAGE SCI), were conducted using a database from 1900 to current (10 April 2010). Web of Science® records were pasted into a database. Records with missing, or incorrect publication dates, and/or volumes numbers, were in most cases deleted.

Proceedings of the Grassland Society of Southern Africa (1979-1983)

The earliest citation from the Proceedings of the Grassland Society was Miles & Tainton (1979). There a total of 10 citations, between 1979-1983, which were broken down as follows: 1979 (4), 1981 (2), 1982 (1), 1983 (3). There were no citations for 1980 (Figure 1).

Journal of the Grassland Society of Southern Africa (1984-1992)

The most frequently cited papers published in the Journal of the Grassland Society of Southern Africa

were: 1) Trollope et al. (1986), 2) Danckwerts et al. (1988), cited 29, and 23 times respectively. Trollope's paper was a technical contribution developing a linear regression equation to calibrate a disc pasture meter for the Kruger National Park (Table 1).

Number of citations per year for this journal peaked in 1992 (195 citations), followed by 1989 with 172, 1990 with 166, and 1991 with 123 (Figure 1).

African Journal of Range and Forage Science
The most frequently cited papers published in the African Journal of Range & Forage Science were by Snyman et al. (1994) cited 16 times, followed by Snyman (1993), which was cited 11 times (Table 1).

The number of citations per year for the African Journal of Range & Forage Science tells a story of initially high citations (66 citations from 1993-1995 (n=3)), followed by declining citations from 1996 to 2003 (only 26 citations: 1996-2003 (n=8)). No citations were recorded for 2000, 2003, or 2005. From 2006 the number of citations have increased. The year with the highest number of citations was in 2006 (36), followed by 1993 (29). The increased citations from 2006 onwards may relate to online access to the Journal via Ingentaconnect (www.ingentaconnect.com), and African Journals Online (www.ajol.info/index.php/ajrfs), which would have resulted in easy access to PDF's.

It is suggested that this exercise be conducted every now and then to access the long term performance of the journal(s), and re-look at the top 20 papers. For more information regarding the Web of Science ™ see:
http://thomsonreuters.com/products_services/science/science_products/a-z/web_of_science

Table 1. Rank and times cited for papers published in the Journal of the Grassland Society, and African Journal of Range and Forage Science.

		Year	Paper
1	29	1986	**Trollope WSW** and Potgieter ALF. Estimating grass fuel loads with a disc pasture meter in the Kruger National Park. J. Grassl. Soc. sth. Afr. 3,4:148-152.
2	23	1988	**Danckwerts JE** and Stuart-Hill GC. The effect of severe drought and management after drought on the mortality and recovery of semi-arid grassveld. J. Grassl. Soc. South. Afr. 5,4: 218-222.
3	21	1987	**Bosch OJH** and Janse Van Rensburg FP. Ecological status of species on grazing gradients on the shallow soils of the western Grassland Biome in South Africa. J. Grassl. Soc. South. Afr. 4:143-147.
3	21	1987	**Stuart-Hill GC**, Tainton NM, and Barnard HJ. The influence of an *Acacia karroo* tree on grass production in its vicinity. J. Grassl. Soc. South. Afr. 4: 83-88.
5	20	1986	**Snyman HA** and Van Rensburg WLJ. Effect of slope and plant cover on run-off, soil loss and water use efficiency of natural veld. J. Grassl. Soc. South. Afr. 3:153-158.
6	19	1991	**Bosch OJH** and Gauch HG. The use of degradation gradients for the assessment and ecological interpretation of range condition. J. Grassl. Soc. South. Afr. 8:138-146.
6	19	1990	**Mentis MT** and Bailey AW. Changing perceptions of fire management in savanna parks. J. Grassl. Soc. South. Afr. 7:81-85.
6	19	1992	**O'Reagain PJ** and Turner JR. An evaluation of the empirical basis for grazing management recommendations for rangeland in southern Africa. J. Grassl. Soc. South. Afr. 9:38-49.
6	19	1985	**Trollope WSW** and Potgieter ALF. Fire behaviour in the Kruger National Park. J. Grassl. Soc. South. Afr. 2:17-22.
10	18	1992	**Milton SJ.** Effects of rainfall, competition and grazing on flowering of *Osteospermum sinuatum* (Asteraceae) in arid Karoo rangeland. J. Grassl. Soc. South. Afr. 9:158-164.
11	17	1984	**Donaldson CH** , Rootman G, and Grossman D. Long term nitrogen and phosphorus application to veld. J. Grassl. Soc. South. Afr. 1,2:27-32.
12	16	1994	**Snyman HA.** Evapotranspiration, water-use efficiency and quality of six dryland planted pasture species and natural vegetation, in a semi-arid rangeland. Afr. J. Range For Sci 11(3):82-88.
13	15	1988	**Moore A**, van Eck JAJ, van Niekerk JP, and Robertson BL. Evapotranspiration in three plant communities of a *Rhigozum trichotomum* habitat at Upington. J. Grassl. Soc. South. Afr. 5,2:80-84.

14	13	1990	**Boonzaier EA**, Hoffman MT, Archer FM, and Smith AB. Communal land use and the 'tragedy of the commons': some problems and development perspectives with specific reference to semi-arid regions of southern Africa. J. Grassl. Soc. South. Afr. 7(2):77-80.
14	13	1990	**Trollope WSW**. Development of a technique for assessing veld condition in the Kruger National Park using key grass species. J. Grassl. Soc. South. Afr. 7(1): 46-51.
16	11	1989	**Archer FM**, Hoffman MT, and Danckwerts JE. How economic are the farming units of Leliefontein, Namaqualand? J. Grassl. Soc. South. Afr. 6(4):211-215.
16	11	1992	**O'Connor TG.** Patterns of plant selection by grazing cattle in two savanna grasslands: a plant's eye view. J. Grassl. Soc. South. Afr. 9(3): 97-104.
16	11	1993	**Snyman HA.** The effect of defoliation during wilting on the production of *Themeda triandra* and *Eragrostis lehmanniana* in semi-arid grassland. Afr. J Range For Sci 10(3): 113-117.
16	11	1990	**Trollope WSW**, Trollope LA, and Bosch OJH. Veld and pasture management terminology in southern Africa. J. Grassl. Soc. South. Afr. 7(1):52-61.
20	10	1992	**Dean WRJ**. Effects of animal activity on the absorption rate of soils in the southern Karoo, South Africa. J. Grassl. Soc. South. Afr. 9(4): 178-180.
20	10	1985	**Fouche HJ**, de Jager JM, and Opperman DPJ. A mathematical model for assessing the influence of stocking rate on the incidence of droughts and for estimating the optimal stocking rates. J. Grassl. Soc. South. Afr. 2(3): 4-6.
20	10	1992	**Morris CD**, Tainton NM and Hardy MB. Plant species dynamics in the Southern Tall Grassveld under grazing, resting and fire. J. Grassl. Soc. South. Afr. 9(2): 90-95.
20	10	1989	**O'Reagain PJ**, and Mentis MT. Leaf silicification in grasses - a review. J. Grassl. Soc. South. Afr. 6(1): 37-43.
20	10	1987	**Snyman HA**, Venter WD, van Rensburg WLJ and Opperman DPJ. Ranking of grass species according to visible wilting order and rate of recovery in the central Orange Free State. J. Grassl. Soc. South. Afr. 4(2): 78-81.
20	10	1986	**Trollope WSW** and Tainton NM. Effect of fire intensity on the grass and bush components of the Eastern Cape Thornveld. J. Grassl. Soc. South. Afr. 3(2): 37-42.
20	10	1989	**Venter J**, Liggit B, Tainton NM, and Clarke GPY. The influence of different land-use practises on soil erosion, herbage production, and on grass species richness and diversity. J. Grassl. Soc. South. Afr. 6(2): 89-98.
20	10	1988	**Zacharias PJK**, Tainton NM, and Oberholster C. The effect of fire on germination in five common veld grasses. J. Grassl. Soc. South. Afr. 5(4): 229-230.

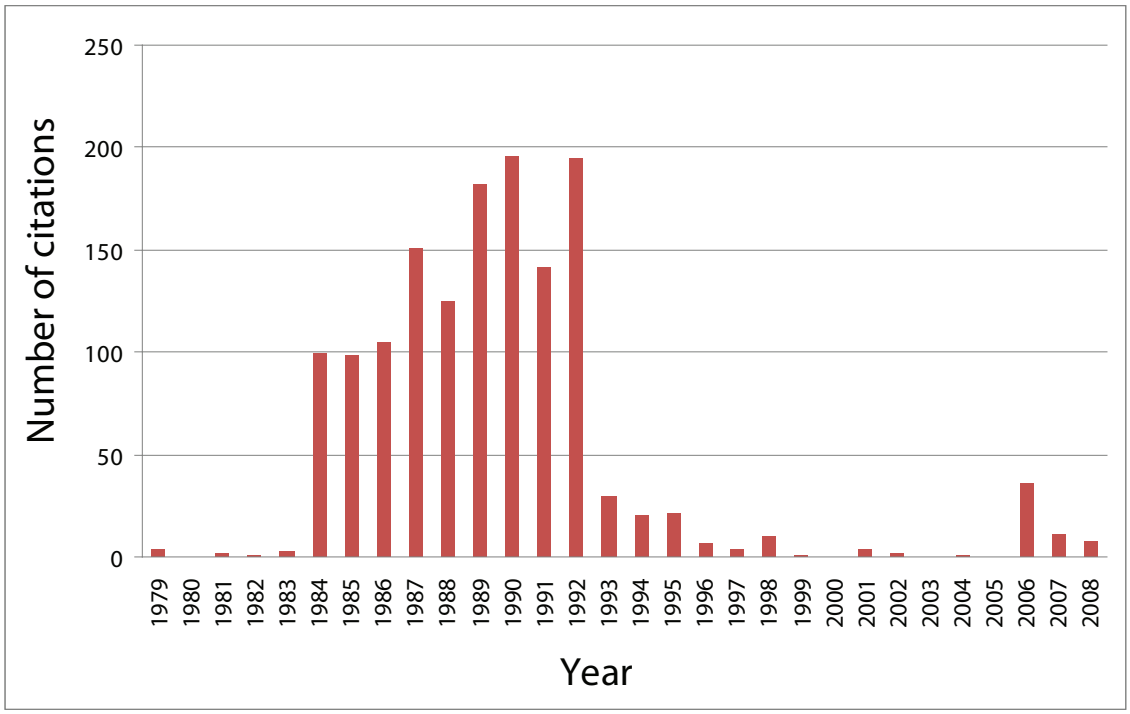

Figure 1: Number of citations per year, for the Proceedings of the Grassland Society of southern Africa, Journal of the Grassland Society of Southern Africa, and the African Journal of Range and Forage Science from 1979-2008.

References

Dyksterhuis EJ 1949. Condition and management of rangeland based on qualitative ecology. Journal of Range Management 2:104-115.

McClaren MP 2000. Viewpoint: Selecting the 5 most important papers in the first 50 years of the Journal of Range Management. Journal of Range Management 53:250-254.

Miles N and Tainton NM 1979. Establishing vegetation on Kimberlite Mine tailings: 1. Defining the problem and selecting species. Proc. Grassld. Soc. Sth. Afr. 14: 37-41.

Westoby M, Walker B and Noy-Meir I 1989. Opportunistic management for rangelands not at equilibrium. Journal of Range Management 42:266-274.