

grass roots

Newsletter of the Grassland Society of Southern Africa

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Vernon Mentoor, Farm Aid, indicating the length of the foggaged kikuyu at the Döhne pasture information day.

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Editorial

Dear members

This is the last issue of the year, and by the time you read this we should all be desperately trying to finish end-of-year reports. Oh yes, and thinking about the holidays.

The disciplines that are found within the GSSA are diverse and our members can be found tucked away in all sorts of interesting or obscure corners of the country, in laboratories, on farms and at research centres. That diversity is possibly our greatest strength, but it also means that we need to be united on issues of importance.

One area where the GSSA can really make a contribution is through our members' participation in other fora. One such body that has recently been established, and which could be an exciting avenue of interdisciplinary cooperation, is AFRICANESS (the African Network of Earth System Science). The body was established in order to foster cooperation between African institutions on research on global environmental change. You can read more about this on page 5. Pete Scogings attended the International Congress of Ecology in the States, and a relatively new body, the South African Soil Surveyors Organisation, was founded in recent years. Mike Peel invites researchers to participate in an exciting transfrontier research initiative. We have an article on conservation (the Endangered Wildlife Trust's Ground Hornbill Working Group), as well as our more traditional veld and pasture research disciplines. GSSA members are involved in all of these organisations and the cross-pollination of ideas and expertise that results from such collaboration is invaluable to our Society.

Speaking of collaborations, I've got some celebrations to attend to. Have a great Christmas and New Year, and we'll see you again after the holidays

Alan

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@gssa.co.za or fax 033-3559 605 or 033-3903113

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NEWS

Science Expo Winners announced

The GSSA presented awards for best presentation in a range and forage related discipline at the Eskom Science Expos. The standard of presentations was very high at all events, and it was often difficult to decide on a winner. Here are the winners:

Pretoria

Emelia Swart (right) of Waterkloof Hoerskool in Gauteng presented a poster titled "Pompom vs. Grass". She investigated the effects of pompom, an invasive weed, on the growth potential of grasses. The scholars were addressed by Mark Shuttleworth, who later walked around to view their projects a very special day for the learners.

-Luthando Dziba

Grahamstown

Charles Gird, Dale Manning and Andrew Still, Grade 9 learners from St Andrews College presented a well-designed experiment to test the effect of soil type and slope steepness on soil erosion rates. The students used a rain machine of their own design to

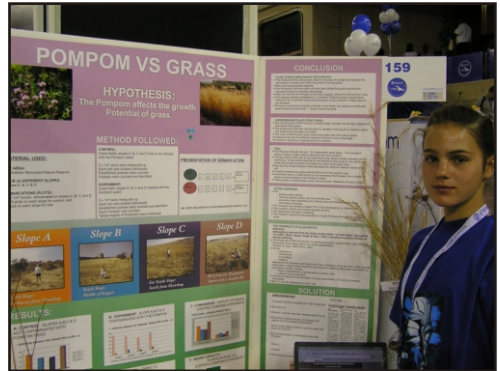
release a controlled amount of water onto four types of soil held in a container at different angles. They measured how much soil was washed away during the experiment and found that river soil and steeper slopes were the most prone to soil erosion. The project also included a comprehensive discussion of soil erosion in South Africa and better soil conservation practices. The three also received the gold medal and will be finalists in Pretoria.

-Susi Vetter

Kimberley

It was a tough choice for us, because not many of the projects entered were purely ecological. Our award went to an excellent applied ecological project, with lots of science and experimentation (through trial and

error). It was a beautifully laid out project and scale



model of a turbine driven hydro-electric system, entitled "Is there an alternative to fossil-fuel generated electricity?", by Candice Owen (Grade 10) of Christian Brothers College.

-Natasha Gabriels

Stellenbosch

Marna Rarich, (Grade 9) of Somerset College, presented a project entitled: "There's an alien in my backyard".

Cape Town

Janet Rebelo of Bergvliet High School presented a project on "Soil types and fynbos".

-Annalene Swanepoel

Council news

We are happy to welcome a new addition to the GSSA family. Nicky Findlay, our Public Relations Officer, and her husband Angus are the proud parents of Liam, born on the 8th of October. We wish them all the best. Luthando Dziba, elected as an additional member at the last Congress, will be taking over the role of PRO.

Mr J du Toit was unanimously accepted by council as the new treasurer, after Mr M Panagos resigned from the position. Together with Mark Hardy, Vice-President of the Society and Trustee of the GSSA Trust, he has investigated the financial status of the Society, which appears to be in better shape than it has been for years.

Nicky Allsopp, our Immediate Past President, has been investigating the proposal by the International Code of Botanical Nomenclature (ICBN) to

change the generic name of the African Acacias. You can read about the results of her investigations on page 8.

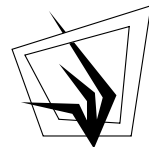
A decision was taken to resurrect and update the expertise database on the website. We therefore urge all members to log on to the website and check their details. More details about the website can be found in this issue, on page 24.

The GSSA awarded three final-year student awards for a range and forage related discipline. They were Kathryn Matchett at the University of KwaZulu-Natal (UKZN), Michelle Payne (UKZN) and Tim Kleu (Cedara College of Agriculture).

There was some discussion about how the GSSA can widen its objectives to include the ecological and environmental sciences more adequately. Part of the marketing of the GSSA must be aimed at ecologists. This will be discussed in more detail at the next strategic planning meeting.

At Congress 40 in July, five of the sessions were mini-symposia arranged by Congress participants themselves. This was well received by the attendees at the Congress, and future organising committees should be encouraged to include symposia driven and organised by specific congress participants.

Grassroots is now available on the website. However, there are still some technical problems, and the file sizes are very large. Freyni is working with Glen Barnes, the Webmaster, to fix the problem.



Members can now pay their fees by credit card. For details contact the administrator at admin@gssa.co.za, or phone 033-3903113.

African countries to form regional network on global environmental change



Nairobi 5 October, 2005 At a historic meeting held in Nairobi last week, scientists from throughout Africa called for a regional network to promote much needed research on environmental degradation in the region.

The aim of the network, initially called AFRICANESS (African Network of Earth System Science), is to provide a regional platform for the study of global environmental change (GEC), the combination of changes that are occurring throughout the world and which are having an impact at the global scale. Climate change is just one of the consequences of GEC.

All countries are affected by GEC but some regions are more vulnerable than others. "The combination of poverty, political instabilities, disease and sensitive ecosystems makes Africa one of the most vulnerable regions in the world," said Professor Eric Odada.

"Environmental degradation does not respect national boundaries. We

need a stronger network of scientists throughout Africa if we are to properly monitor the dramatic changes occurring in the region and provide our governments and out people with the information needed to respond effectively," said Hon. Stephen Kalonzo Musyoka, Kenya Minister for Environment and Natural Resources.

The network will also enable African scientists to speak with a unified voice on issues of serious concern in the region such as desertification and dwindling water resources. By coordinating their efforts they can more easily set collective research agendas and share data.

The network will initially focus on:

- **Water and climatic modelling**
- **Desertification**
- **Land degradation, biodiversity, and food security**
- **Health and pollution**
- **Marine ecosystems**

The combination of poverty, political instabilities, disease and sensitive ecosystems makes Africa one of the most vulnerable regions in the world

“An important aspect of the network will be working with policy makers and social / natural scientists to ensure that the research agenda supports societal and policy needs,” said Professor Sospeter Muhongo, ICSU Regional office for Africa.

An organizing committee with broad regional representation has been established. The next step will be to procure funding for a Secretariat and infrastructure to support the network.

“This really is an important development. Similar networks in Africa have been attempted in the past but this is the first time that scientists from across Africa have been able to come together to discuss openly their needs and find a common way forward,” said Dr. Seko Toure, UNEP Regional Office for Africa.

The meeting was organised by the Earth System Science Partnership (ESSP) and the International Council of Science (ICSU) with support from the US National Science Foundation, the New Partnerships for Africa's

Development (NEPAD) and the National Research Foundation (NRF), South Africa.

The Earth System Science Partnership (www.essp.org) is a partnership of four global environmental change programmes: Diversitas, the International Geosphere-Biosphere Programme (IGBP), the International Human Dimensions Programme (IHDP) and the World Climate Research Programme (WCRP). The Pan African Secretariat (PASS), a joint ESSP activity on capacity building, was responsible for the logistical organization of the event.

For more information about the Africaness proposal please contact:
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Membership fees for 2005/06 are due by the end of January 2006. All invoices will be issued by the end of November 2005. Payment may be made via cheque, electronic deposit or online credit card payments (contact Freyni for details).

Category	2003/04	2004/05	2005/06
Ordinary	R 225	R 260	R300
Associate	R 200	R 230	R265
Professional	R 250	R 290	R335
Family	R 340	R 390	R450
Overseas (South)	R 563	R 563	R595
Overseas (North)	R 975	R 975	R975
Institution	R 780	R 780	R780
Retired	R 130	R 75	R78

The Transfrontier Transect

An opportunity to learn about the effects of different wildlife management regimes across Africa's prime wildlife area

Mike Peel

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With the creation of the Limpopo Trans-Frontier Park exciting research opportunities have emerged to look at the effects of wildlife management over time and at different intensities. The protected areas of the eastern and central Lowveld and escarpment and the Mozambique transfrontier zone form this transfrontier ecosystem. This region supports one of the most diverse large mammal populations found in any subregion in the world, and covers an area of about 4 million ha. The largest part of this area is covered by the Kruger National Park (KNP) of 2 million ha and the Limpopo National Park in Mozambique of 1 million ha. This area is variously managed as national park, provincial nature reserve, private reserve, wilderness, resource area and state land. These management regimes vary from "hands off" in most of the Limpopo Park to very intensive management of wildlife in the private game reserves, with the Kruger National Park in between.

Fences separating different land uses have changed animal migration patterns while the proliferation of artificial water points has altered the mammal and plant species composition and distribution. However, it is very difficult to determine what the ideal state could be and depends largely on the objectives for the area. For

example, due to the low impact of man in the area, the newly created Limpopo National Park in Mozambique is the closest to being in a 'pristine' state when compared to the intensively managed areas to the west of the KNP. The study area thus provides a unique opportunity to measure the long-term effect of the different management regimes utilized in the Kruger National Park, adjacent private reserves and resource areas.

To make use of this research opportunity we hope to launch a combined project with Limpopo National Park and the private reserves to improve the understanding and knowledge about the effect of management (fire, fencing, water provision etc.) on the ecosystem and on sustainable resource utilization

Study area

We hope to include the following areas in the study:

- The Wildlife sanctuary in the Limpopo National Park
- The Limpopo National Park
- The Kruger National Park
- The Adjacent Private Protected Areas (APPA) to the west of the KNP
- Mariyeta Resource area between Thohoyandou Punda Maria road and the

Letaba river

The project goals are:

- Scientifically based recommendations for long-term wildlife management in the Lowveld at different scales and management intensities
- An improved understanding of the system resilience to management procedures and resource utilization
- A baseline that could be used

to detect long term change in biodiversity and system function

We welcome anyone that is interested in joining in on this project that we hope will be of benefit to all the parties involved in the research.

For more details contact:

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Acacia name change

Nicky Allsopp

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DNA analyses has shown that the genus *Acacia* could be divided into five separate groups each of which could stand as a genus. The African species are found in three of these genera. All the Australian fell in a single genus.

Nomenclature is published in the International Code of Botanical Nomenclature (ICBN) which provides a rule-bound process for allocating names to plants. Among these rules is the one establishing the right for the original type, in this case *Acacia nilotica*, to retain the generic name. However, there are also provisions for a new type to be allocated to a generic name. There is a rule around nomenclatural stability which argues that the genus which retains the most species when a genus is split gets the original generic name. So, although there is speculation that the Australians won the case for retaining "*Acacia*" for their species through public pressure, the rules of the ICBN allow this on legitimate grounds. Australia has about a 1000 species in *Acacia* whilst the rest of the world shares only a few hundred. This splitting of the rest of the world's species into several genera make it difficult, in my opinion, to argue for the use of *Acacia* for African

species.

The new nomenclatural proposals for *Acacia* have been published in *Taxon*. Then the spermatophyte committee of the ICBN recommended the changes to the General Committee who have also agreed to them. The Nomenclature Section of the International Botanical Congress presented this name change as a resolution to the Congress which passed the name changes, so this is now incorporated in the ICBN. The final word is that according to the ICBN the genus *Acacia* has been split and the name given to the Australian species and a few other species from Asia and Africa.

There is a loophole for those of us who do not like this change. Classification, as opposed to nomenclature, is not regulated by these rules. People are free to follow the classification scheme they choose. Synonyms are not necessarily illegitimate names. So you can continue to call *Acacia karroo* this legitimately, or its new name *Vachellia karroo*. If you refer to the genus you can use *Acacia sensu lato* to refer to the old genus in its broad sense, or *Acacia sensu stricto* to refer to the new ICBN delimitation of the genus.

Endangered Wildlife Trust's Ground Hornbill Working Group

Kerryn Morrison

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The Endangered Wildlife Trust (EWT) is one of the largest conservation non-governmental organisations in southern Africa. Initiated in 1973, the EWT functions through the work of its Working Groups which collectively coordinate between 90 and 110 projects throughout southern Africa. The EWT conserves threatened species and their habitats through field-based projects, applied research and community conservation programmes and has developed effective partnerships with a wide variety of stakeholder groups to achieve these goals.

The Ground Hornbill Working Group was established in September 2004. The EWT, with its vast experience in establishing and running multi-stakeholder Working Groups which address critical conservation issues practically and effectively, established the Ground Hornbill Working Group to coordinate a wide spectrum of Ground Hornbill conservation activities, conduct field work, undertake applied research and investigate methods of mitigating and reducing the threats facing this species and its important habitat.

There are less than 2000 Ground Hornbills (*Bucorvus leadbeateri*) left in

South Africa, and the species has experienced a 50% decline in range and more than a 10% decline in numbers over the past three decades. As a result, the species is classified as Vulnerable according to the Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland (Barnes, 2000). It is an easily identifiable species on sight and sound, and is an ideal flagship and indicator species for the savannah and woodland biome. However, the species is also found on the verges of natural forests and in the surrounding grasslands.

In recent years, activities relating to the conservation of Ground Hornbills have increased, and a programme to collect second chicks from the Kruger National Park for rear and release into areas where they had become regionally extinct, was established at the Mabula Game Reserve. The use of artificial nest boxes, research into breeding habits and general monitoring of the birds by a number of organisations has also been conducted.

Ground Hornbills live in family groups of between two and eleven birds, comprising a dominant alpha breeding pair, a variable number of juveniles and adult male helpers. The species' vulnerability is increased as a

result of this social structure, and by the fact that only one chick out of a possible three eggs fledges. Furthermore, the dominant pair breeds on average every 2.5 years and successful fledgings occur on average only every 9 years.

The stronghold for the species is primarily within formal conservation areas. With territories of over 100km², the birds forage over wide areas, but cannot survive and breed in areas without suitable natural holes in either trees or rock faces for nesting. Disturbance at cliff sites and the removal of large trees pose a threat to the survival of these birds. Other threats include afforestation which impacts on suitable grassland foraging habitat, poisoning and the use of the species in local cultural practices,

In February 2005 the Endangered Wildlife Trust's Ground Hornbill Working Group convened a Population and Habitat Viability Assessment Workshop (PHVA), facilitated by the IUCN's (World Conservation Union) Conservation Breeding Specialist Group (CBSG) Southern Africa, and held at the Southern African Wildlife College near Hoedspruit. The aim of the workshop was to identify the major threats and conservation priorities for the species and its habitat throughout the sub-region. The 35 participants at the multi-stakeholder workshop represented the conservation NGO community, academic institutions, captive breeding facilities, the IUCN Reintroduction Specialist Group,

forestry companies, SANParks, governmental departments, provincial parks boards, private game reserves and traditional healers.

Together, the group developed a prioritised action plan for the future of Ground Hornbills in South

Africa.

Ground Hornbill conservation in the future will focus on four themes, including research into the biology of



in particular in their association with rain making. Another threat is direct persecution due to their habit of attacking their reflection in window panes which occasionally results in breakages and damage to property.

the species and their ecological needs, quantification, qualification and mitigation of their threats and education and awareness. Overall, the primary objective for Ground Hornbill conservation will include the establishment and registration of a management plan for Ground Hornbills and their savannah habitat in the context of the National Environment Management Biodiversity Act.

With a Ground Hornbill Conservation Action plan in place with clear priorities identified, the future approach to the conservation of these magnificent birds will be better coordinated and more focussed on addressing the key issues that will contribute to securing their future.

Thank-you to The Green Trust, Sasol, Johannesburg Zoological Gardens and the National Zoological Gardens, without whose support this workshop

would not have been possible.

If you have any information on Ground Hornbills, or would like further information

on the species, the PHVA or the conservation programmes now in place, please contact Kerryn Morrison on Kerryn@ewt.org.za or (011) 486-1102 or 082 877 5126.

There are less than 2000 Ground Hornbills left in South Africa



Report on the 9th International Congress of Ecology and 90th Annual Meeting of the Ecological Society of America, Montreal, Canada, 5-12 August 2005

**Peter Scogings
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I attended the joint 9th International Congress of Ecology and 90th annual meeting of the Ecological Society of America, 6-12 August 2005 in Montreal, Canada. The UniZulu Research Committee (R15,691) and the Grassland Society of Southern Africa Trust (R10,000) paid the expenses.

The theme was "Ecology at Multiple Scales". There were over 4200 people. About 15 South Africans attended, while another 15 were co-authors who did not attend. The Scientific Programme ran for 4.5 days, from 8 to 12 August, during which there were 39 poster sessions, 169 oral sessions, 53 organised oral sessions, 24 symposia and 14 special sessions. Approximately 1100 posters and 2300 papers were presented. Twenty-two workshops and 10 field trips were held during the 2 days before the scientific programme commenced, while a further 14 workshops and 3 field trips were held during the course of the

scientific programme. A total of 126 additional events and meetings took place during the period 6-12 August. I participated in one full-day and one half-day fieldtrip. I also attended the opening plenary lectures of both ESA and INTECOL, as well as the INTECOL general assembly and closing plenary.

One of the valuable outcomes of attending large international conferences is that one is able to place one's own research in a broader, global perspective. I concentrated on the plant-herbivore sessions, of which there were 5 oral and one poster, as well as two grasslands sessions and a special session on comparative plant ecology. As with previous ESA and INTECOL meetings that I have attended (1994-1997) I found that the vast majority of plant-herbivore presentations were on insect herbivory and they tended to focus on a few specific plant-insect systems. The general lack of attention paid to plant-mammal systems globally makes research in such systems all the more interesting, but also more challenging.

Another valuable outcome of any conference is derived from interacting with other researchers. On one of the fieldtrips, I renewed contact with colleagues at Texas A&M University. As a result, I was able to catch up with what they are doing there in terms of tree-deer systems in southern Texas, where the savanna vegetation is very similar to that on the east coast of South Africa.

I presented a poster during Poster Session 34: Herbivory. There were 27 posters in the session. Fruitful discussions were held around my poster during the session.

Effects of soil resources and grass competition on responses of *Acacia karroo* to simulated browsing

Peter Scogings, Keletso Mopipi and Winston Trollope

When resources are abundant, tannin concentration is predicted to decline relative to nitrogen concentration because of the assumed growth-defence tradeoff, and tannins are induced by herbivory because defoliation is assumed to reduce N relative to C. In opposite conditions, defoliation is expected to reduce the tannin:N ratio by reducing C relative to N. A split-plot experiment was conducted to investigate effects of irrigation, fertiliser, grass cover and clipping on leaf N and condensed tannins of *Acacia karroo* seedlings in a semiarid, fertile savanna. Seeds were collected from one tree and glasshouse-germinated in soil collected from beneath the tree. After four months the seedlings were transplanted into a field. Irrigation was the splitting factor. Treatments were applied randomly in five blocks within each main plot. Half of the seedlings received limestone-ammonium-nitrate fertiliser, while commercial *Eragrostis tef* was planted around half the seedlings. Half the seedlings were clipped 3 cm above ground level two months after transplantation and responses were estimated four months later. Clipping reduced N of irrigated plants, and increased N of unirrigated plants, in the absence of grass cover. Irrigation increased N and reduced tannin in unclipped plants without grass cover. By reducing N and not

affecting tannin, clipping in relatively high resource conditions resulted in elevated tannin:N ratios. The reverse occurred in relatively low resource conditions, but through N elevation, not tannin reduction. Increased resource availability led to reduced tannin:N ratio of unclipped plants

through its opposite effects on both tannin and N. While the predictions of general resource-driven hypotheses of plant defence were supported, the mechanisms appeared to differ from the ones usually assumed. The poster was illustrated by two figures (Figure 1 and Figure 2).

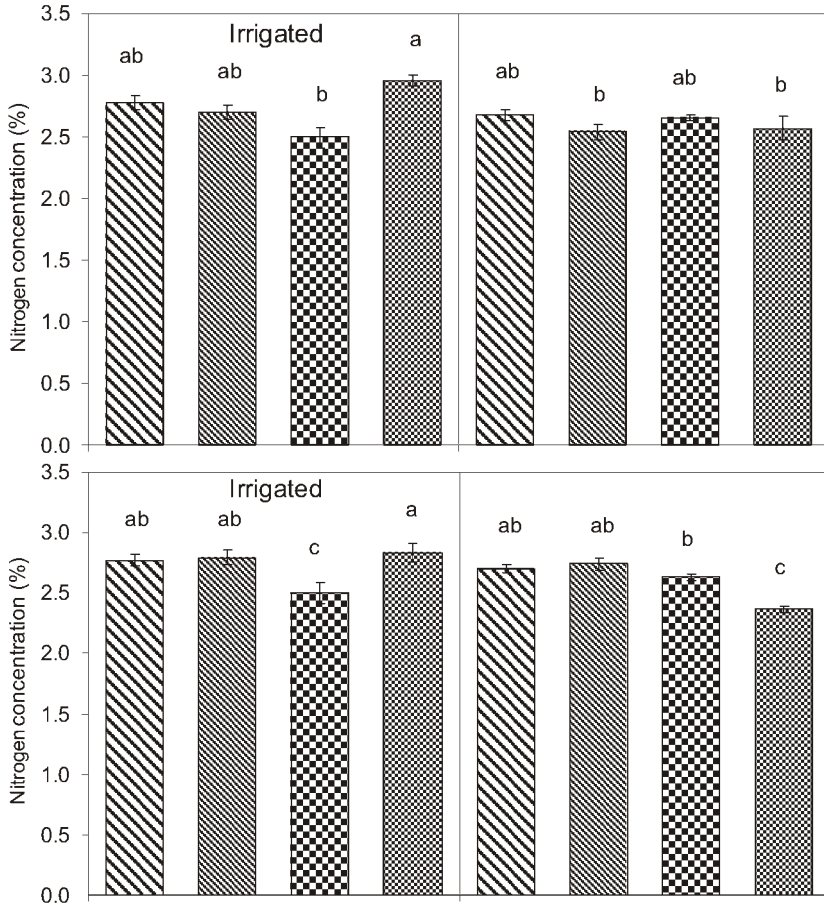


Figure 1. Mean (\pm SE; $n = 8$) nitrogen concentration (% dry mass) in leaves of *Acacia karroo* seedlings 20 weeks after early wet season clipping at Fort Hare, South Africa. Seedlings were either irrigated (to simulate 150% rainfall) or unirrigated in a split plot. Striped bars represent nitrate fertilisation (upper graph), or grass cover (lower graph), while bold fillings represent clipping at 3 cm above ground. Letters indicate significant differences according to Scheffé's post-hoc test ($P = 0.05$).

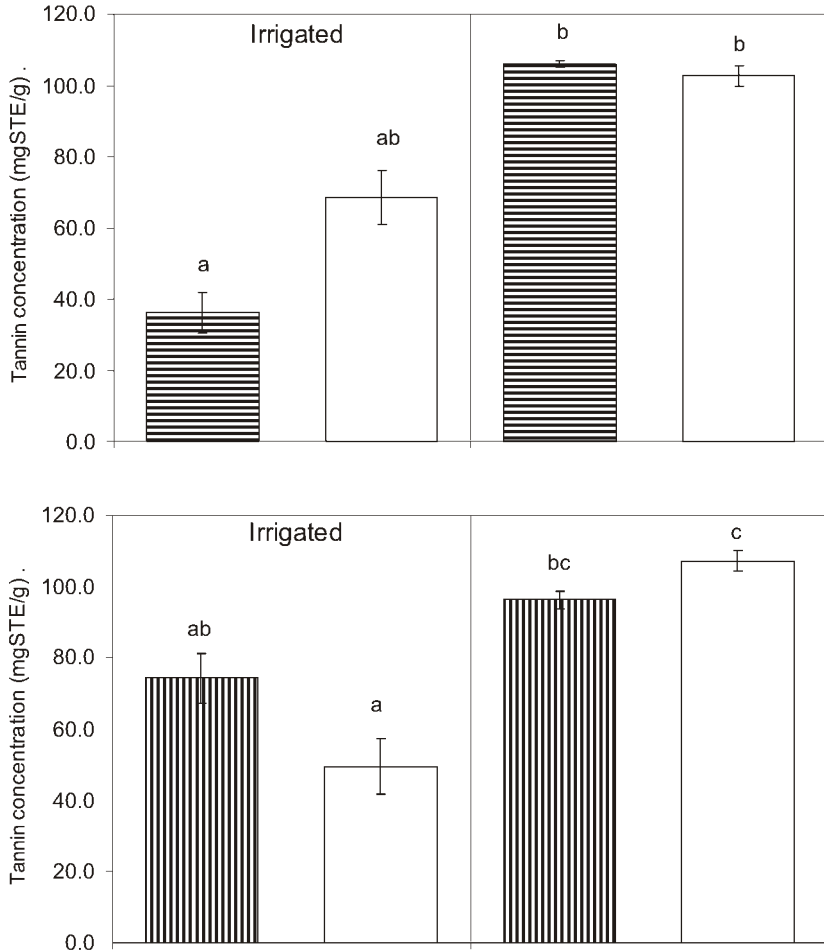


Figure 2. Mean (\pm SE) condensed tannin concentration (mg Sorghum Tannin Equivalents g⁻¹ dry mass) in leaves of *Acacia karroo* seedlings 20 weeks after early wet season clipping at Fort Hare, South Africa. Seedlings were either irrigated (to simulate 150% rainfall) or unirrigated in a split plot. Striped bars represent means (n = 10) of plants clipped at 3 cm above ground (upper graph), or plants with grass cover within 50 cm (lower graph). Clear bars represent means (n = 20) of unclipped plants (upper graph), or plants without grass cover (lower graph). Letters indicate significant differences according to Scheffé's post-hoc test (P = 0.05).



PASTURE

INFORMATION

DAY AT

DÖHNE

Pieter Conradie

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The Pasture Section at Döhne Agricultural Development Institute recently held the fourth in a series of information days. Whereas the previous three events were held in communal farming areas in the Ciskei and Transkei regions of the Eastern Cape, this information day was held at Döhne and targeted the commercial farming sector. The day was attended by seventy five people of which more than half were commercial farmers.

The first part of the day focused on strategies to over winter livestock on Döhne Sourveld, which forms a large part of the natural vegetation of the higher lying areas of the Eastern Cape.

Mr Neels De Ridder demonstrated that through split nitrogen application early in the season, and the subsequent foggaging of kikuyu, economically justifiable quality winter feed can be provided. In another very exciting trial he compared the production potential in terms of crude protein, crude fiber, as well as total digestible nutrients between six kikuyu types. The best performing 'foreign type' annually produced 27% more dry matter (DM) than the local type. This

kikuyu type was selected from a total of forty one types, which were originally collected in Kenya and eventually found their way via New Zealand and Australia to the Döhne nursery in 1998.

Dr Charl le Roux applied fifteen years of experience to compare a number of legumes. Information on adaptability, production potential and response to fertilization of legumes such as *Coronilla varia* (crownvetch), *Lotus corniculatis* (birdsfoot trefoil), *Onobrychis* sp. (sainfoin), *Desmodium* sp. (greenleaf, silverleaf, 'Döhne') etc. were provided using Lucerne as 'control'. He concluded that legumes hold a huge potential for large parts of the Eastern Cape, especially *Desmodium subsericium* ('Döhne Desmodium'), which can be used extensively considering its proven persistency and self generation ability.

To complete the first session Mr Jorrie Jordaan demonstrated lucerne management for optimum production in a practical manner. Trials done at the Cradock and Middelburg clearly demonstrate that management practices such as fertilization, cutting, grazing, irrigation etc. has a much greater affect on DM production of

lucerne than cultivar selection.

After tea Mr Wiseman Goqwana introduced the section on rangeland management with a stimulating presentation on the use of veld condition assessment as a tool for monitoring, evaluation and improvement of veld in communal and commercial grazing areas. As an example he used the model developed for the assessment of two veld types in the Sterkspruit area of the North Eastern Cape.

Thereafter Mr Stimela Ganqa reminded farmers of the appropriate use of fire as a tool for veld management. The guidelines to veld burning in the Sourveld areas of the Eastern Cape were also made available.

Professor Winston Trollope was the invited speaker for the day. He concluded the formal presentations with a thought-provoking talk on the challenges of bush encroachment presently experienced in many parts of the country. The traditional approach was to regard this phenomenon as foe and therefore to change the vegetation to suit the livestock. Another approach is to change the type of livestock to goats and/or game which are adapted to utilize the bush. Ecologically sustainable and economically viable options need to be explored that will enable farmers to deal with this ever increasing problem.

After the presentations the pasture trials were visited and then attendants were treated to a braai.



Black Economic Empowerment in the dairy industry

**Dairy Symposium hosted by
the Milk Producers'
Organisation (MPO) KZN and
the Grassland Society of
Southern Africa: Part 1
1 September 2005**

Boston Country Club

Compiled by

Dave Goodenough

ARC-Livestock Business Division
Animal and Forage Production

Over 100 farmers, advisors, researchers and various other delegates from the agricultural sector attended this symposium at which the following papers were presented:

Dairy Farmers and Black Economic Empowerment (BEE)

This presentation was delivered by Mr Carlos Boldogh, Chief of Operations, KZN Department of Agriculture and Environmental Affairs.

Government is committed to purchasing suitable land for BEE and to encouraging emerging farmers to

move up the ladder of development to commercial farming. Government will buy suitable land for BEE projects and so willing sellers of commercial farming land must be identified and fair valuations determined. Thus, Government's role will be to not only purchase land for BEE beneficiaries at fair value, but also to fund landcare programmes for BEE beneficiaries.

Government also plan to introduce learnership programmes for BEE candidates, including the funding of farming mentors to support BEE ventures, training in financial aspects of farming thus ensuring a profitable enterprise, providing CASP funds for tractors, fencing, irrigation, etc, and accessing export opportunities.

Potential BEE partners need skills to farm. They must also have money to purchase land and to finance BEE operations as well as access to markets and a "voice" in the enterprise.

Local dairy and other farmers are also encouraged to employ black Cedara graduates with a view to some of them ultimately becoming BEE farmers.

The KZN Department of Agriculture and Environmental Affairs acknowledges that the local dairy industry plays a vital part in KZN Agriculture. The Department would like to help facilitate BEE ventures with members of the Milk Producers Organisation (MPO) and will assist in launching BEE dairy farm ventures and other BEE farming operations.

A BEE Initiative in the Eastern Cape Dairy Industry

Trevor Elliott, the well-known dairy

farmer from the Tsitsikamma, spoke about a recent BEE development in the Eastern Cape involving the formation of the "Grasslands Development Trust", which he founded.

Nine of the 10 Trustees of this Trust are Blacks and the beneficiaries are 49 Black employees who run the farm or who are retired employees.

This Trust purchased a 485 ha dairy farm from a commercial farmer through a "LRAD" grant from the Department of Land and a Kuhla LREF loan via the Standard Bank. Infrastructure for this farm was funded by means of a grant from the Department of Agriculture, Eastern Cape and a Kuhla LREF loan via the Standard Bank.

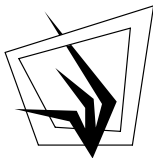
This dairy farm has 120 ha under irrigation with 750 dairy cows producing 3.75 million litres of milk annually. The operating structures for this farm are based on the New Zealand sharemilking concept whereby the sharemilker provides the dairy cows, movable equipment, management and labour for the BEE commercial farmers, with profits from milk sales being shared 50:50 by the sharemilker and the BEE farmers, the scheme thus providing an equal financial return for both parties.

Similarly, the supplementary feed bill is shared 50:50 by the BEE farmers and the sharemilker while costs related to the land eg labour, fertilizer, seed and irrigation costs are paid by the BEE farmers and the sharemilker pays the animal veterinary costs.

This sharemilking model has several benefits. Apart from the land being 100 % owned by Blacks,

professional management is retained and an environment is created for joint business decision making, mentoring and training. Furthermore, the Trust (land owner) as the employer has the final say and holds the power, resulting in genuine empowerment.

Broad-based training skills are being developed through a dairy farm cadet programme. The BEE farmers also attend applicable local and overseas conferences and courses. It has recently been announced that this "Grasslands Development Trust and Grasslands Agriculture" BEE venture are the winners of the "Empowerment Deal of the Year 2005



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NATIONAL GRASSLANDS BIODIVERSITY PROGRAMME: GRASSLANDS FORUM MEETING

Date: Thursday 24 November 2005

Time: 8:30 13:30

Venue: Auditorium, Biodiversity Centre, Pretoria Botanical Gardens, 2 Cussonia Avenue, Pretoria. (Tea and lunch will be served)

The programme has reached an important stage where it is defining its strategic focus. We wish to report back to the broad grasslands forum on progress. In addition, the forum would also discuss the strategic focus as well as the programme's vision, objectives, and targets.

DRAFT AGENDA

1. Welcome and introductions
 2. NGBP progress report
 - a. Presentation
 - b. Discussion
 3. Vision, objectives and targets
 - a. Presentation
 - b. Discussion
 4. Sectoral and spatial focus areas
 - a. Presentation
 - b. Discussion
 5. Way forward and closure
- Please send confirmation of your attendance by 10 November 2005.

We look forward to your participation. Contact Florence Nazare on 012-8435291 or email nazare@sanbi.org See next page for a report on the NGBP.

Progress Report on the

National Grasslands

Biodiversity Programme

July - September 2005

Lala Steyn

Grasslands Biodiversity Programme Developer. Lala.steyn@mighty.co.za

Introduction and programme management issues

The NGBP is in the design phase, and the objectives of this phase are:

- To design the NGBP to secure natural resources and meet biodiversity targets in the grasslands biome
- To design the project document to meet the UNDP-GEF requirements
- Explore whether existing programmes that have the same objectives as the NGBP, want to align themselves with the NGBP and see what they are doing to manage biodiversity in grasslands.

Update

Florence Nazare joined SANBI in August as the programme coordinator.

A Grasslands Steering Committee has been established that provides oversight, advice and facilitates the design phase of the NGBP. It has the following members: SANBI; Forestry South Africa;



AgriSA; DWAF; DEAT; DoA; GDACE - representing the urban sector; UNDP GEF regional and SA offices; and WWF The Green Trust.

The NGBP is tasked with mainstreaming biodiversity into the Urban, Forestry and Agricultural (extensive and intensive) sectors. Two additional sectors have been proposed recently: Mining and Tourism. The area of Conservation Planning is cross cutting, providing vital decision support tools required by the programme. The NGBP is tasked with working in six provinces: Gauteng (overlaps with the urban sector); Mpumalanga; Eastern Cape; KZN; Free State; and North West.

Urban sector

An Urban Development and Biodiversity Workshop was held with 74 participants from 31 institutions national, provincial and local government, civil society, private sector associations, research and academic institutions.

The workshop resulted in the establishment of a Grasslands Urban Team. Its aims are to design

the urban Gauteng-based component of the NGBP; to provide leadership and direction to the content of the urban Gauteng-based component of the NGBP; to serve as a discussion forum for implementation of the Gauteng Conservation Plan; and to facilitate information sharing. Members come from the following organisations: GDACE; Tshwane metro; Ekurhuleni metro; Jo'burg metro; Sedibeng District Municipality; Emfuleni Local Municipality; Mogale City LM; West rand DM; IAIA and WESSA.

Six potential areas for intervention within the urban sector were identified

- Making plans work in metropolitan councils
- Making plans work in district and local municipalities
- Conservation of priority sites through utilisation
- Private sector engagement
- Urban edge and the built environment
- Law enforcement

Next steps

A log frame meeting for the urban component will be held on 3 and 4 November

Forestry sector

A Forestry Development and Grasslands Biodiversity workshop was held on 28 September and was attended by 45 participants. The aim was to explore with industry, government and other stakeholders what is being done to secure biodiversity within the grasslands biome while meeting the industry's challenges. It resulted in the formation of a Forestry Design Team that will take responsibility for the detailed designing of what

interventions the NGBP will undertake in this sector. The Team presently has 9 members (2 DWAF, 2 SANBI, 1 Forestry SA, 1 rep of small/emerging timber growers, 1 rep of big timber growers, 2 civil society GSSA&EWT)

The workshop provided guidance that the NGBP forestry component should develop interventions in the following areas:

- Securing unplanted forestry land for biodiversity and ecosystem services
- Management of unplanted forestry land
- Small growers, in particular regarding expansion of new forestry plantations
- Management of existing plantations

Agricultural sector

To date discussions have been held with the following agricultural stakeholders: AgriSA; the Wildlife Ranching Association (formerly SAGRO); National Department of Agriculture; provincial Departments of Agriculture in E Cape, Mpumalanga, and Free State. It has been proposed that an Agricultural Advisory Team be established to provide strategic direction to the agricultural component of the programme.

Due to the scale of the agricultural sector it was decided that a strategic focus is required, to facilitate maximum impact for the given budget. The first is a comparative economic study of key agricultural enterprises to identify those expected to grow in the next 5 to 10 years.

The second is an assessment of which agricultural enterprises hold the greatest threat for biodiversity, and which have the potential for

biodiversity compatible interventions.

The findings from these studies will be presented to stakeholders at the Grasslands Forum meeting of 24 November 2005.

Conservation planning

A provincial biodiversity conservation plan that identifies biodiversity priority areas is an essential decision support tool for the NGBP. The fact that GDACE's Gauteng C-plan2 has provincial cabinet approval lends it the weight needed for the plan to be taken seriously by both the public and private sectors.

KZN has a technically advanced conservation plan but faces many implementation challenges.

Mpumalanga has completed a first draft of their conservation plan. They have been supported by SANBI and the Steering Committee responsible for the process is a key institutional mechanism through which the NGBP should work.

There is no province-wide systematic conservation plan for the E Cape but rather a number of finer scale and biome specific conservation plans such as CAPE, STEP, Maloti-Drakensberg Transfrontier Park (MDTP) and the Wild Coast and Pondoland plans. DWAF is busy with a Strategic Environmental Assessment (SEA) and a systematic conservation plan for the Mzimvubu to Keiskamma Water Management Area. This work should be completed by April 2006 and should provide critical planning information for the grasslands within the province.

The Free State province has resolved to develop a Biodiversity Conservation Plan. The NGBP will support the

presentation of the process for developing the plan to management of the FS Department of Tourism, Environment and Economic Affairs (DTEEA) for approval.

The North West province has undertaken a number of planning processes. The detail of these and the need or not for a provincial conservation plan will be discussed with them during a visit planned at the end of October.

Mathieu Rouget from SANBI is working with Belinda Reyers, contracted by the NGBP, to develop a grassland biome biodiversity profile and spatial biodiversity priority assessment. This plan will be presented to stakeholders at the Grasslands Forum meeting scheduled for 24 November 2005 (see ad on page 18).

Provincial visits

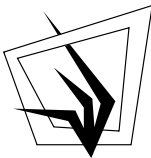
During July to September visits were undertaken to Mpumalanga, the Eastern Cape, KwaZulu/Natal, Free State, and within Gauteng. A North West visit is scheduled for late in October 2005.

Economic Issues

The issue of a study to design a Financial Mechanism/Revolving Trust has emerged strongly: the idea is that a financial mechanism (such as a trust) is established to support the securing of biodiversity priority sites. The trust would initially be capitalized and using these funds it could purchase priority biodiversity land and sell them to buyers willing to accept title deed restrictions and conservation management implications. These sites would be bound by stewardship agreements with a conservation agency. Money

from the sale of the sites would go back into the Trust for new purchases. This is not a new idea and has been implemented successfully in other countries such as Australia and the USA. The SA context is clearly different and key issues such as land reform have to be taken into account. The NGBP is in the process of discussing the matter with DEAT and hopes to thereafter commission the development of a feasibility/business case for the idea. As other bioregional programmes have been exploring the issue for some time, this needs to be handled as a national initiative.

In line with the project document the NGBP needs to address the issue of placing a value on the ecosystem services provided by the grasslands biome and this was discussed in some depth with KZN stakeholders. As part of a Working for Water project to place an economic value on controlling invasive alien species, a total economic value of the remaining intact grasslands biome is in the process of being estimated. This work has been undertaken by the Western Cape Department of Agriculture and CSIR. The NGBP will be commissioning work to make certain adaptations to the work, add additional information (such as comparisons) and produce a short document and presentations for various audiences that makes the case for the grasslands biome in terms of its ecosystem value.



South African Soil Surveyors Organisation

Pietermaritzburg workshop

The next SASSO workshop is at Pietermaritzburg on the 24th and 25th of November 2005. The program includes lectures by the father of soil classification, Dr. Chris MacVicar, and on-site lectures by experts on soil management. The annual general meeting with election of office bearers and year end function will conclude the Thursday. The workshop closes at 12:00 on Friday. We will visit about 18 soil profiles over the course of the workshop. Visit the SASSO website at www.sasso.co.za or contact Piet le Roux on:

Fax: 051 4012212

Tel: 0823717572

Email:

LeRouxPA.SCI@mail.uovs.ac.za

A Fresh Breeze in Agricultural Management

Strategic Approach to Farming Success by Wim Nell (South Africa) and Rob Napier (Australia), applies strategic management principles to agriculture.

The main feature of this book is its practical approach. Exercises at the end of each chapter help to compile a strategic plan for a farming business to guide the reader to sustainable farming success. It can be applied to any farming situation throughout the world.

Visit www.farmingsuccess.com or contact Wim Nell on email NellWT.SCI@mail.uovs.ac.za or phone +27(0)51 401 3759/2557.

The South African Soil Surveyors Organisation



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Introduction

The South African Soil Surveyors Organisation (SASSO) was founded in 2001 with 18 members, and has grown to its current 42 in four years. The members represent 20 institutions including co-operatives, fertilizer companies, institutes of the Agricultural Research Council, staff of the Provincial Departments of Agriculture and tertiary institutions.

SASSO serves the land evaluation industry where soil plays a dominant role. Land evaluation is the process whereby land is graded for its suitability for a specific use. Most of the members of SASSO are in the business of evaluating land for its suitability to produce cash crops under dryland and irrigation agriculture, but evaluation of land for urban development and environmental impact assessments are also in line. There is a huge growth in awareness of the role of soil in the environment,

resulting in the related field of work expanding rapidly.

Mission

SASSO is a non-profit organization whose mission is to uplift the people involved in the land evaluation industry by equipping them with up-to-date knowledge and skills. Aspects that are addressed include:

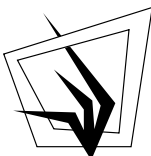
- Identification of relevant soil properties.
- Classification (naming) of soils to improve communication.
- Interpretation of soil data.
- Application of models (simple and advanced) estimating the suitability of soils for crop production.
- Creation of an open forum for the discussion of relevant issues.
- Registration and accreditation of soil surveyors to create and uphold standards in the industry.
- Advancement of the image of land evaluation experts and the role they play in optimizing land use.

Significance

The members of SASSO make a significant contribution to the crop production industry. It is estimated that the benefit is more than R400 m per year. SASSO creates a forum for open discussion. This process resulted in a culture where everybody comes to learn and all come to contribute.

Workshops

SASSO meets once every quarter for a two-day workshop, held in various places around the country. Since the organization started, the workshops have grown steadily so that every workshop had a record attendance. The last workshop, at Douglas in the Northern Cape, focused on the unique challenges facing crop farmers irrigating soils in an arid environment. The workshops are aimed at facilitating communication between practitioners by visiting soil profiles, classifying them, and discussing the management implications of that soil type for a particular land use. Some lively debate occurs around the soil pits, but this belies the friendly atmosphere of the workshops. People interested in SASSO activities can visit the website at www.sasso.co.za.



The GSSA Website: Members Only Page

Glen Barnes is currently upgrading the website so that it will become a lot more interactive for the Society members, and dynamic in terms of the information it contains. However, in its current state, it certainly has a lot to offer.

Currently, Society members are able to login to the Members Page of the website and search the expertise database or the membership database. The latter search is a useful tool for finding contact details of other members with whom you may wish to communicate.

The expertise database lists those members who have expert knowledge in a wide variety of fields, including communal range management, fynbos, game management, savanna, problem plant management and veld rehabilitation. It also lists the various categories into which the members of the Society fall, e.g. academic, consulting, farmer, etc.. Unfortunately the expertise database is not fully utilised at present, and updates from all the members will be requested early in 2006. Please take a moment to complete these updates and enhance the value of the website for all.

If you would like to be ahead of the game and update your expertise portfolio and check your details at the same time then: login, go the Members Page, type your surname in the search box, click on Notify Us, update all details, and submit.

By this point, many of you will be wondering how to login! Please send an email requesting the login information to admin@gssa.co.za, and I shall happily let you in on this secret. Currently all members login in the same way, using the same username and password. Glen will be implementing a more secure and unique method once the upgrading of the website is completed.

Short-term influence of fire in a semi-arid grassland on (3): litter production, root and litter turnover

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Introduction

Unplanned fires, which are a normal phenomenon in the semi-arid areas, could have a drastic effect on the functioning of the grassland ecosystem, ranging from the reduction or elimination of aboveground biomass (Snyman 2003a, 2004a) to impacts on belowground physical, chemical and microbial mediated processes (Neary *et al.* 1999; Snyman 2003b). Depending on several fire severity measures, changes in belowground components can be either beneficial or deleterious to the entire ecosystem (Snyman 2005b). Vegetation cover and litter, through limiting runoff and promoting infiltration (Snyman 1999; Ekaya and Kinyamario 2001), is an important control on the amount and efficiency of plant production which could also negatively influenced by fire, especially in the more arid areas (Van de Vijver 1999; Snyman 2003a). Litter tends to stabilise soil water and soil temperature (Willms *et al.* 1993), thus improving conditions for germination, and often the presence of litter alters the botanical composition of a plant community through the effects on soil nutrient status (Ekaya and Kinyamario 2001). Although litter

is an important functional compartment of grassland ecosystems in terms of nutrient recycling, little work has been carried out to investigate the patterns of litter turnover (above- and belowground dead material) (Wolfson and Tainton 1999; Ekaya *et al.* 2001). The objective was therefore to quantify the short-term (two years) impact of a fire on the soil characteristics and turnover of litter and roots.

Procedure

The research was conducted in Bloemfontein (28°50'S; 26°15'E, altitude 1350m), which is situated in the semi-arid (summer annual average 560mm) region of South Africa. The study area is situated in the Dry Sandy Highveld Grassland (Grassland Biome) with a slope of 3.5%. At the start of this study the veld was in good condition (veld condition score was 92% of that of the benchmark site) and dominated by the climax species *Themeda triandra* with *Eragrostis chloromelas* and *Elionurus muticus* also occurring relatively abundantly. Soils in the study area are mostly fine sandy loams of the Bloemdal Form (Roodepoort family 3 200). Clay content increases with soil depth from 10% in the A-horizon (0 to 300mm) to

24% in the B1-horizon (300 to 600mm) and 42% in the B2-horizon (600 to 1200mm).

The research was conducted on 18 plots of 10 x 10m each, with an edge effect of 5m around each plot. The three treatments included fire burning against the wind (back fire), with the wind (head fire) (Trollope 1978), and a control with no burning. The experimental layout was a fully randomized design with three replications for each treatment. The application of the different treatments on 30 August 2000 and on 23 August 2001 as well as the fire behaviour are fully discussed in the previous

volumes of Grassroots (Snyman 2005a,b).

The aboveground litter (dead plant material separated from mother plant) for all treatments were determined every second month at the end of October, December, February and April of the 2001/02 growing season. The August 2000 burn treatments were therefore defoliated the first time in 2001, after resting for a full growing season. As the burn treatments of the two separate years were defoliated the first time the same year, variation of climate on phytomass productions was largely excluded. Eight 0.5m² quadrats were randomly placed in each plot, in

Table 1: Cumulative litter production (kg/ha) for the unburnt and burnt (first [A] and second [B] seasons after burning) grassland measured every second month. Least significant difference (LSD) is calculated at the 1% level. Data are means and standard errors.

Months	Unburnt	Burnt			
		Head fire		Back fire	
		A	B	A	B
August LSD = 19.61	130.00 ±16.15	17.0 ±1.66	76.2 ±9.14	15.0 ±2.12	75.6 ±15.14
October LSD = 16.22	104.2 ±12.12	9.5 ±0.12	42.5 ±8.17	8.9 ±2.00	43.1 ±18.15
December LSD = 10.60	70.0 ±10.15	10.4 ±0.22	42.5 ±9.14	9.1 ±2.14	43.9 ±19.14
February LSD = 14.21	122.6 ±16.82	12.2 ±0.30	67.4 ±15.16	11.5 ±3.16	64.1 ±22.14
April LSD = 11.11	129.7 ±19.14	15.9 ±0.45	70.3 16.14	14.2 ±3.55	66.5 ±6.15
June LSD = 13.66	136.2 ±21.65	17.1 ±1.01	77.3 ±9.15	15.9 ±6.65	76.2 ±8.14
Average	115.45	13.68	62.70	12.43	61.58

which the litter was hand-picked after which the grasses were defoliated to a height of 30mm. In the laboratory, the litter was washed with running water over a two mm sieve to get rid of attached soil particles. All plant material was then oven-dried at 80°C. Care was taken that the bi-monthly defoliations and litter collection within the growing season were not from the same site, by marking the previously used quadrats.

Results and discussion

Aboveground litter production

The aboveground surface litter production was decreased ($P \leq 0.01$) by the fire in all months for one and two seasons following the fire (Table 1). This trend is expected as fire not only lowers basal cover (Snyman 2004b), but also aboveground production (Snyman 2005a). Two seasons following the fire, litter was still lower ($P \leq 0.01$) (47% - average for head and back fires) than that of unburnt grassland. The litter production differed non-significantly ($P > 0.05$) between head and back fires over the two growing seasons. The small difference in aboveground phytomass production between the two types of fires (Snyman 2005a) is the most important reason for this. Various researchers also reported a considerable decrease in litter with a fire treatment (Emmerich and Cox 1992; Blank *et al.* 1994) which could decrease productivity (Willms *et al.* 1993; Holm *et al.* 2002; Snyman 2003a, 2004a).

The average litterfall of 116 kg/ha from the unburnt grassland in this study is lower than the 750 kg/ha from

semi-arid *Astrebla pectinata* grassland in Australia (Ingram 2003). Monthly litter production in the semi-arid Rift Valley province of Kenya, ranged from 314 kg/ha in August to 1304 kg/ha in December, with a mean monthly litter yield of 925 kg/ha (Ekaya and Kinyamario 2001). The difference between highest and lowest bi-monthly litter production is greater in unburnt grassland than that of burnt grassland. Therefore it can be concluded that litter turnover or decomposition should be much faster in unburnt than in burnt grassland. This must also be seen against the background of litter turnover being very slow in most arid and semi-arid grasslands (Whitford *et al.* 1988).

Expressed as a proportion of annual phytomass production (Snyman 2005a), litterfall was 5.88% and 1.13% (average for head and back fires), for the first season following the fire and for the second season after burning respectively; and 5.74% and 3.65% (average for head and back fires) for unburnt and burnt grasslands respectively. These values are much lower than reported values from other semi-arid rangelands of 16% (*Astrebla pectinata* grassland, Ingram 2003), 11% (*Themeda triandra* grassland, Ingram 2003) and 9% (*Eragrostis xerophila* grassland, Ingram 2003). Patterns of litter accumulation may also reflect drought (West 1984), prevailing wind conditions (West 1984) and the extent to which material remains attached to the plant after senescence (Danckwerts and Aucamp 1985). Litter plays a crucial role in nutrient cycling and soil organic matter build-up in grassland ecosystems. It increases soil-water through the

effects on infiltration (Emmerich 1999), evaporation (Thurow *et al.* 1988), and runoff (Wright *et al.* 1982; Emmerich and Cox 1992; Snyman 1999). It tends to stabilise soil-water and soil temperature (Du Preez and Snyman 2003), and often the presence of litter alters the botanical composition of a plant community through the effects on soil nutrient status (Ekaya and Kinyamario 2001).

Root and litter turnover

Despite the many sampling problems that could occur in determining root turnover (Shackleton *et al.* 1988), the ratio of annual increment to peak root phytomass was used in this study (Dahlman and Kucera 1965). The root mass as determined by Snyman (2005b) on the same plots was used in this calculation. The annual increment was taken as the difference between the maximum and minimum root phytomass production recorded during any one year. Turnover times calculated for this study were

calculated using the annual increments over the first and second seasons after burning (Snyman 2005). The same approach as used for root turnover was also applied to the estimation of litter turnover. The root and litter turnover rates were also applied to the estimation of litter turnover. The root and litter turnover rates, as well as the calculated times for decomposition, are presented in Table 2 for both unburnt and burnt grassland (first and second season after burning).

The turnover rates for both roots and litter are lower with burning. Burning lengthened the replacement of the total root system by about a year, with decomposition of litter taking three months longer (Table 2).

If the ratios are calculated from the average root phytomass or litter production (Sims and Singh 1971), instead of peak values (Dahlman and Kucera 1965), the turnover times were on average only 5.3 to 7.6 months shorter in all treatments. The same shortened turnover rate was calculated

Table 2: Calculated root and litter turnover rates/year and time for decomposition (months) for the unburnt and burnt (first [A] and second [B] season after burning) grassland.

	Turnover rate (per year)		Replacement roots (months)	Decomposition aboveground (months)
	Roots	Litter		
Unburnt	0.61	0.49	19.67	24.49
Burnt (A)				
Head fire	0.36	0.44	33.33	27.27
Back fire	0.35	0.43	34.29	27.91
Burnt (B)				
Head fire	0.59	0.47	20.34	25.53
Back fire	0.58	0.46	20.69	26.09

by various researchers (Shackleton *et al.* 1988). Obviously certain portions of the root system are more active than others (the fine root system, for instance) and therefore turnover times will not be uniform for the whole system (Shackleton *et al.* 1988). In general belowground material consistently decomposed faster than aboveground material (Ekaya and Kinyamario 2001). In most arid and semi-arid rangelands litter and root turnover is very slow (Whitford *et al.* 1988). In warm, high rainfall areas, breakdown of grass litter is rapid (could be 50% to 52% of mass in three months), but the rate depends on moisture availability and species (West 1984; Mott *et al.* 1992; Shackleton *et al.* 1988; Ingram 2003). The turnover rates for roots of 0.61 obtained in this study for unburnt grassland compares well with that obtained in other grassland areas of the world. Turnover times are generally higher in grazed sites (Sims and Singh 1971; Shackleton *et al.* 1988). Root turnover results obtained in Africa, North America, India and Marion Island varied for grazed grassland between 0.19 and 0.68 and for ungrazed areas between 0.22 and 0.77 (Dahlman and Kucera 1965). Grassland and savanna are the most fire-adapted ecosystems, with 83-85% of their C belowground (Neary *et al.* 1999).

Conclusions

Fire is often blamed for having caused grassland degradation in southern Africa. However, it could be an extremely useful and in many situations an indispensable

management tool if used correctly. It would seem likely though, that it has contributed to degradation when it has been associated with over-stocking, poor grazing practices and the grazing of sheep, in particular, during the post-fire recovery period (Tainton *et al.* 1993; Trollope 1999). The post-fire management is therefore believed to have caused most of the degradation associated with the use of fire, rather than fire *per se*. Though the above is perhaps more applicable in the higher rainfall areas, this study clearly showed that fire and the management of grassland after a fire must be handled more circumspectly in the arid and semi-arid areas. In these areas, where small changes may have long-lasting consequences, increased research must be focused on belowground sustainability, particularly primary productivity and the impacts of land management practices such as fire on ecosystem functioning.

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New book: Karoo veld ecology and management

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Karen J. Esler is an associate professor of Conservation Ecology at the University of Stellenbosch. She developed her interest in the Karoo while studying at the University of Cape Town and completed her PhD (1993) on vegetation dynamics at Tierberg, the

Karoo Biome Project research site in the Succulent Karoo. She continues to co-author a range of publications on the ecology of semi-arid systems in southern Africa.

Sue J. Milton and Richard Dean co-authored the first edition of "Karoo Veld". This book grew from the Karoo Biome Project, a National Research Foundation study initiated in 1987 at the Tierberg field site near Prince Albert. The research stimulated much interest in the ways in which organisms interact and respond to rainfall, drought and grazing management. Sue is a freelance researcher, lecturer and consultant.

Richard Dean is an ornithologist at the Percy FitzPatrick Institute of African Ornithology, University of Cape Town, studying the biology of birds and plant-animal interactions in arid and semi-arid ecosystems. Recent projects include editing (with Sue Milton) a synthesis of research in the Karoo (1999, Cambridge University Press), and a book on nomadic desert birds (2004, Springer, Berlin). He is a co-editor of the 2005 revision of Roberts' Birds of South Africa.

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