TIME	TITLE	AUTHOR/S
POSTER SESSION: Rangeland Ecology and Management (Session Chair: Graham P von Maltitz)		
10:45-10:50	Rare and endemic *Acacia* species from South Africa	***G Nico Smit***
10:50-10:55	The classification and mapping of the natural vegetation on Marievale Bird Sanctuary on the Eastern Highveld	***Rouxdene Deysel*** *and W Jan Myburgh*
10:55-11:00	A plant ecological study and management recommendations for the Greater Vaaljkop expansion	***Jennifer H Manganye*** *and Eurika van Heerden*
11:00-11:05	Does thicket formation ameliorate water stress experienced by encroaching trees?	***Jack R Kambatuku****, David Ward and Michael D Cramer*
11:05-11:10	Effect of 16 years of annual burning on Döhne Sourveld	***Andile N Nobakada*** *and Mfundo Macanda*
11:10-11:15	Water, vegetation and elephant impact: Results from private nature reserves adjacent to the Kruger National Park	*Mike J S Peel, Rina (C) C Grant, John M H Peel* ***Andre F Jacobs****, Collen Rabothatha and Thabile Mokgakane*
11:15-11:20	Development of an integrated decision making tool for more effective and proactive herd and flock management in extensive veld grazing systems in Southern Africa	*T Victor Musetha, Keith A Ramsay, Kedibone B Chueu and* ***Martha Moumakwa***

Rangeland Ecology and Management

SESSION CHAIR: GRAHAM P VON MALTITZ

Poster Presentations

RARE AND ENDEMIC *ACACIA* SPECIES FROM SOUTH AFRICA

G Nico Smit

University of the Free State, Department of Animal, Wildlife and Grassland Sciences, PO Box 339, Bloemfontein, 9300, South Africa, email: smitgn.sci@ufs.ac.za

As part of an update of the book "Guide to the *Acacias* of South Africa" by the first author, four newly described *Acacia* species from South Africa were collected and studied for purposes of inclusion in the new publication. Three of these species are from Sekhukhuneland – an area known as a centre of endemism. Much of the vegetation in the area has been impacted on negatively by human activities and these species can thus be considered threatened and could in future be assessed as critically endangered. Some conservation and management measures are discussed. In addition to a brief description of these species, high quality photographic illustrations are presented, which are possibly the first or only photographic illustrations of these species:

Acacia ormocarpoides P.J.H. Hurter (Leolo Thorn). It is only known from a few localities on the Leolo Mountains in the upper catchment of the Motse River in Sekhukhuneland, Limpopo Province where it occurs in rocky areas. It is a small tree that grows to a height of 3.5 m with long slender branches, often bending downwards.

Acacia sekhukhuniensis P.J.H. Hurter (Sekhukhune Thorn). It is known only from an isolated, flat-topped quartzite mountain near the north-eastern boundary of Sekhukhuneland. It occurs gregariously in open woodland and wooded grassland on quartzite ridges overlain by relictual Kalahari-type sand.

Acacia robbertsii P.P. Swartz (Hairy Sekhukhune Thorn). It is known from a small area near Steelpoort on the boundary of Sekhukhuneland, Limpopo Province where they occur in open woodland and wooded grassland. It is a small to medium sized tree that grows to a height of 4-6 m. It has a distinctly greyish appearance due to dense velvety hairs on the leaves and shoots.

Acacia ebutsiniorum P.J.H. Hurter (Ebutsini Thorn). It is known from a single gregarious population at an altitude of 1 140 m in a mountainous area north-east of Oshoek, Mpumalanga. Individuals grow in exposed, open grassland on a steep south-east facing slope where they are periodically subjected to fire. It is a small, slender shrub or tree with bright green foliage. It is

mostly multi-stemmed, up to 2.5 m high, the height no doubt being influenced by its sporadic exposure to fire.

THE CLASSIFICATION AND MAPPING OF THE NATURAL VEGETATION ON MARIEVALE BIRD SANCTUARY ON THE EASTERN HIGHVELD

Rouxdene Deysel*#1 and W Jan Myburgh2

[1]Gauteng Department of Agriculture, Conservation and Environment, Private Bag H616, Heidelberg, 1438, South Africa, email: rouxdene.deysel@gauteng.gov.za, [2]Tshwane University of Technology, Department of Nature Conservation, Pretoria, 0001, South Africa

The natural vegetation of Marievale Bird Sanctuary was sampled during April and May 2006 using 23 relevés of 200 m² size. A total of 167 plant species were recorded in the 23 sample sites making use of the Zürich-Montpellier (Braun-Blanquet) method (Werger, 1974) and the Plant Number Scale (Westfall and Panagos, 1988). The recorded data was classified by making use of the PHYTOTAB-PC computer program package (Westfall *et al,* 1982). The resulting classification produced three plant communities each floristically and environmentally distinct from the others. The quantitative data collected and analysed for each of the three plant communities indicated that the vegetation cover and structure is in an acceptable ecological state. The three plant communities and vegetation map have been verified and can be used as the basis for biodiversity management and for the implementation of a monitoring programme. Further recommendations, based on the quantitative data recorded during the study include the criteria for monitoring site selection, short- and long-term monitoring techniques and a proposed herbaceous yield method.

A PLANT ECOLOGICAL STUDY AND MANAGEMENT RECOMMENDATIONS FOR THE GREATER VAALJKOP EXPANSION

Jennifer H Manganye# and Eurika van Heerden*

University of Limpopo, Medunsa Campus, Department of Biology, PO Box 139, Medunsa, Pretoria, 0204, South Africa, email: evh@ul.ac.za

The main aim of veld management is to support or improve the quality and production of the veld so that animal production can be increased and that the area can sustain as high a fauna and flora species diversity as possible. The objective of the reserve is to conserve genetic diversity of animal and plant species that occur in the area. This study was undertaken with the objective to identify and quantify different homogeneous management units of the Vaalkop Dam Nature Reserve and to come up with recommendations for an ecologically sound management plan for the Reserve to facilitate more effective management regarding grazing utilization, burning and monitoring. Vegetation units had to be identified and mapped.

The Vaalkop Dam Nature Reserve was divided in different homogenous areas. Sample plots of 30 x 30 meters were placed randomly in the identified broader homogenous plant units. The sample sites should be the smallest area that will adequately describe the vegetation of the whole area. A cover abundance scale was allocated for each species present in the sampled plots surveyed. All other environmental and sampling data, such as the relevé number, date, GPS reference (Global Positioning System), locality, vegetation type, land type, altitude, aspect, slope, geology, soil, biotic influence and canopy cover was acquired and recorded for each sample plot on a data form. The line belt method was used for tree monitoring and the information was used to determine tree density.

The vegetation of the Vaalkop Dam Nature Reserve consists of five main communities, each with a number of sub-communities, some with variants. The communities identified are: *Andropogon schirensis – Aristida congesta* community, *Eragrostis chloromelas – Setaria sphacelata* var. *sphacelata* community etc. The results were used to map the plant communities and the proposed management areas for the Vaalkop Dam Nature Reserve.

Different vegetation units on the Vaalkop Dam Nature Reserve were identified, classified, described and interpreted. Some sample sites had both indigenous and exotic bush clump elements. A vegetation map of the reserve and new data on the species list are now available for the Vaalkop Dam Nature Reserve. The results of this study should serve as a baseline for future regular monitoring implying that the management of the reserve would be able to determine whether the veld condition has remained the same, improved or deteriorated over time. Hopefully

this study will also empower decision-makers on local, provincial and national level to continue to protect and develop this Nature Reserve in a sound and ecologically sustainable manner.

DOES THICKET FORMATION AMELIORATE WATER STRESS EXPERIENCED BY ENCROACHING TREES?

Jack R Kambatuku[1*], David Ward[1] and Michael Cramer[2]

[1]University of KwaZulu-Natal, School of Biological and Conservation Sciences, Private Bag X01, Scottsville, Pietermaritzburg, 3209, South Africa, email: kambatuku@yahoo.co.uk, [2]University of Cape Town, Department of Botany, Private Bag X3, Rondebosch, Cape Town, 7701, South Africa

Wiegand et al. (2005) postulated that tree growth and intra-specific tree competition convert bush-encroached patches to an open savanna through competitive elimination of weaker trees by dominant ones. Key among the scarce resources for which trees compete in arid savanna environments is water. When trees are freed from competing neighbours, the degree of water stress suffered by such free-growing trees will be less than trees experiencing competition from neighbours. To test this assumption, a total of 30 *Acacia mellifera* trees (target) in the semi-arid Northern Cape had neighbours removed in 2004 within a 7.5m radius, based on the lateral extent of their rooting systems. An additional 30 trees (control) in the same area were selected and tagged. Comparative monitoring of tree water potential (Ψ) using conventional pressure bomb technique (Scholander, 1964) during February, April and November since 2006, is being used as an indication of plant water stress experienced by individual trees with and without competition. Concomitant measurements of height and canopy diameter served to record growth of the study plants. Preliminary results to date reveal no overall significant differences between the midday Ψ of target and control trees but a more negative Ψ for control trees compared to target trees is apparent, resulting in a smaller difference between predawn and midday Ψ for control trees. However, this general trend varies during the year, with target trees recording lower (more negative) Ψ relative to control trees in February and April and the reverse being achieved in November. Control trees maintain a smaller (less negative) difference between predawn and midday Ψ readings throughout the different periods of the year in comparison to target trees, although this difference is not significant in February and November and highly significant in April. Tree height and canopy diameter has been monitored since 2004 and shows that, although control trees were taller and grew faster, they have reached the same height as target trees since November 2006. However, target trees have consistently maintained a larger canopy diameter and canopy volume relative to control trees. A substantial number of the control trees (i.e. experiencing competition) tend to suffer partial deaths, where a whole branch or section of the tree dies off. This may be related to water stress as. In conclusion, we have found a number of effects of release from competition on *Acacia mellifera* trees, although our water stress results only show these results during the late rainy season.

EFFECT OF 16 YEARS OF ANNUAL BURNING ON DOHNE SOURVELD

Andile N Nobakada[#] and Mfundo Macanda[*]

Eastern Cape Department of Agriculture, Dohne Agricultural Development Institute, Private Bag X15, Stutterheim, 4930, South Africa, email: mfundo.macanda@ecprov.agr.co.gov, mcmfu@yahoo.co.uk

A trial of season of burning of Döhne Sourveld was initiated in 1989. The objective of the trail was to compare the effect of burning during winter (July, August) and spring (September, October) and early summer (November) on plant vigour, species composition basal cover and tiller characteristics of grass sward. The plots were burnt annually on the day that is suitable for burning in as prescribed in the guidelines of burning sourveld. The period that is used to burn in the month is from the 15th to 30th of every month. The trial was burnt from 1989 until 2004. Trends analysis on species composition is discussed in this paper. The *Themeda triandra* is promoted by burning during August and September (275% and 281% respectively) while *Tristachya leucothrix* is promoted by late burns of October and November (139% and 201% respectively). *Elionorus muticus* is suppressed by September, October and November burns (40%) and promoted by July burn (400%). *Eragrostis plana* is suppressed by burning as it has gone extinct with spring burning and was reduced by winter burning. The trial affirms the fact that burning period for Döhne Sourveld is August and September. This period will suppress unwanted grasses and promote preferred species.

WATER, VEGETATION AND ELEPHANT IMPACT: RESULTS FROM PRIVATE NATURE RESERVES ADJACENT TO THE KRUGER NATIONAL PARK

Mike J S Peel[1*], Rina (C) C Grant[2], John M H Peel[1], Andre F Jacobs[1#], Collen Rabothatha[1] and Thabile Mokgakane[1]

[1]Agricultural Research Council, Livestock Business Division, Range and Forage Unit, PO Box 7063, Nelspruit, 1200, South Africa, email: mikep@arc.agric.za, [2]South African National Parks, Kruger National Park, Private Bag X402, Skukuza, Nelspruit, 1350, South Africa, email: rinag@sanparks.org

Large herbivores such as elephant generally dominate in terms of biomass in savanna areas; Owen-Smith (1992) states that their nutritional requirements therefore have a greater impact on vegetation than other species in the community. In addition they have an additional impact through trampling and breakage. The consequences of such utilisation vary depending on the species selected, the levels of damage inflicted, season of impact, elephant densities, period of the impact, and the effect of the interaction with other factors such as rainfall, soil, fire, other herbivores, the provision of artificial water and bush control. Within the constraints of time and money, it is therefore important to quantify the impact of elephant on the natural resource base.

Results are provided based on the following:

1. Damage severity on an eight point scale where 0=no damage; 1=1-10%; 2=11-25%; 3=26-50%; 4=51-75%; 5=76-90%; 6=91-99%; and 7=100%;
2. Proportion of damage measured per species surveyed (e.g. % of *Combretum apiculatum* trees measured which were impacted upon);
3. Relative impact on a species basis (e.g. *Combretum apiculatum* trees impacted upon as a % of all trees impacted upon); and
4. Damage per height class.

DEVELOPMENT OF AN INTEGRATED DECISION MAKING TOOL FOR MORE EFFECTIVE AND PROACTIVE HERD AND FLOCK MANAGEMENT IN EXTENSIVE VELD GRAZING SYSTEMS IN SOUTHERN AFRICA

T Victor Musetha[*], Keith A Ramsay, Kedibone Chueu and Martha Moumakwa[#]

National Department of Agriculture, Directorate: Animal & Aqua Production Systems, Private Bag X138, Pretoria, 0001, South Africa, email: victormu@nda.agric.za

The majority of stock owners and keepers in South Africa are dependent on natural veld as the major source of food for their ruminants - and need to cope more effectively with seasonal dry periods and droughts as part of the sustainable use of their grazing

A decision making tool that will link rainfall predictions to a veld assessment tool, market and fodder information is being developed to enable stock owners to make a more informed choice when it comes to options to offset the potential harm to both animals and the veld.

Rainfall prediction data will be used as an early warning to enable stock owners to plan well in advance when there is little to no chance of rain for the foreseeable future.

This would include on site veld assessment to calculate the available grass and the number of animals it will be able to support.

With this information, it will be possible to determine the surplus and to review options as far as these animals are concerned.

These would include buying feed, selling animals at an auction or to an abattoir, private sales, etc. All the options will be supported with information on service providers to facilitate an on farm decision to avoid the all too common situation where many stock owners keep animals until it is too late to get a reasonable price as a result of lost condition or oversupply.

The tool will also enable the stock owner to plan a more regular cash flow by linking this information to a relevant management calendar.