## *Habitat Selection and Foraging Behaviour of Wildlife*

**SESSION CHAIR: MARNA HERBST**

*Thursday, 22 July 2010, 14:00-15:45*

*Platform & Poster Presentations*

### PLATFORM PRESENTATION: WHAT MAKES A FORAGE PATCH MORE ATTRACTIVE TO HERBIVORES AND WHAT ARE THE CONSEQUENCES?

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Herbivore distribution and utilization is driven by complex factors that have been studied over many years. Forage quality and quantity are known to be important drivers of herbivore numbers and distribution. However, the spatial scales at which herbivores select forage in different seasons play an important role in their survival. In many cases the response of the vegetation to herbivory is also different. Animals tend to select areas of high nutrients in the growth season while there is sufficient moisture to stimulate plant growth. The grass sward of these patches tends to be dominated by lawn grasses that are very resilient to heavy utilization, and are in many cases maintained by intense herbivory. These are often the only areas that supply sufficient nutrients to support growth and reproduction in many of the less fertile such as the granitic soils in the Kruger National Park. The taller, perennial grasses that dominate the sward outside the grazing lawn patches, tend to be less favoured during the growth season, and are less resilient to herbivory. However, these grasses are very important for maintenance of body condition during the dry season where they act as key resource areas for animal survival. The significance of these patches in the production and reproduction of herbivore species favouring vegetation at different heights is not well understood, but higher nutrient patches are favoured by most herbivores as can be seen by the predilection of herbivores for recently burnt patches and vegetation on termite mounds. This change in spatial use, related to nutrient distribution, may help explain the recent evidence showing that animal production is higher in non-rotational rangeland systems than in systems using rotational grazing systems The role of fire and herbivores in creating and maintaining these high nutrient forage patches under different rainfall regimes will be explored and the need for further research emphasized.

**NOTES:**

### PLATFORM PRESENTATION: EFFECTS OF FIRE FREQUENCY ON SEASONAL DISTRIBUTION AND BEHAVIOUR OF HERBIVORES IN THE KRUGER NATIONAL PARK, SOUTH AFRICA

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Fire and herbivory interact in important ways to influence community structure and ecosystem dynamics in savanna grasslands. A lot of research has shown how both fire and herbivores either individually or together impact on the vegetation. To better understand savanna and grassland plant community and ecosystem responses to fire and herbivory, it is critical to examine how herbivores respond to fire regimes and the mechanisms underlying these responses. This study seeks to determine herbivore behavioral responses to different fire frequency treatments and the potential mechanisms underlying these behavioral responses.

The study was carried out in the Kruger EBPs at Satara, Marheya and Nwanetsi. The August annually burnt, triennially burnt and unburnt plots were used at each site. In addition, a new plot (approximately 7 ha to match the existing plots) adjacent to the existing long term plots in Satara, Marheya and Nwanetsi was burnt (at the end of July 2009) to control for the botanical species composition change. The specific objectives are to determine: i.) the effect of fire frequency on seasonal movement, behaviour (e.g. herd size) and foraging patterns of herbivores. The possible driving mechanisms to be determined are: i.) forage quality ii.) forage quantity iii.) Botanical species composition iv.) plant primary productivity (ANPP) v.) Visibility measurements/ predation risks vi.) soil nutrient. For the herbivore sampling, herbivore abundance survey conducted by driving around the plots day time slots (6h00-9h00, 9h00-12h00, 12h00-15h00 & 15h00-18h00) and for the night (20h00-01h00), dung count and herbivore behavioral observations.

Preliminary results showed that herbivore distribution was not significantly affected by season but was significantly affected by burning treatment (fire frequency). The grazers preferred plots that were burnt more frequently and the browsers and mixed feeders preferred plots that were burnt less frequently. Herbivore behavior was significantly affected by season, i.e. in the wet season herbivores generally spent more than 50% of their time feeding and were more vigilant of their predators whereas in the dry season they spent less 50% of their time feeding and were not vigilant of the predators.

**NOTES:**

## PLATFORM PRESENTATION: SPATIAL AND TEMPORAL VARIATION IN HABITAT USE OF SOME HERBIVORE GAME SPECIES IN A SMALL FENCED PROPERTY, CENTRAL FREE STATE

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Variables such as water, food, shade, shelter, space and competition are all determinants of the habitat that animals will occupy. Knowledge of these determinants is important for managers of small game ranches where different herbivore species are competing for limited resources. This is especially important where game species are introduced in areas where they did not historically occur. The objectives of this study were to determine: (i) whether small seasonal movements related to different habitat usage occur, specifically in the case of browser- and mixed feeder game species, and, (ii) if interspecific competition between different species in terms of space and food occur.

The study was conducted on 435 ha of the Wag-'n-Bietjie Private Nature Reserve, located in the central Free State, approximately 30 km north of Bloemfontein. Geographically the area is located in the Grassland Biome, but due to close proximity of the Modder River the vegetation resembles riparian thicket. Two watering points were present and the furthest distance from a waterhole was 2.5 km. Feed was supplied from June to September. Fixed routes were traveled by vehicle every fortnight and the GPS position and number of all species encountered were recorded. This data was compared with a vegetation map and surveys of the study area using ArcView (GIS). Faecal samples were collected, dried and nitrogen concentration determined by the Leco Nitrogen analyser.

Small seasonal changes in areas frequented by the different species were observed. During the wet season (summer and autumn) the giraffes were mostly observed in dense thicket between two dry drainage lines, while during the dry season (winter and spring) they favoured the area surrounding the main feeding area. Kudu favoured dry drainage lines during the wet season, while they also frequented the feeding areas during the dry season. Eland moved from grassland and open thickets, which they favour during the wet season, to the ecotone between the dense and open thicket and closer to the feeding areas, during the dry season. In the dry season the

impala moved from the north-western side of a drainage line, which they favoured during the wet season, to a dense thicket on the south-eastern side of the drainage line.

Competition for suitable habitat in terms of space due to the small size of the reserve, density of woody plants and available food during winter proved to be high, especially in the dense thicket and drainage lines where most of the woody plants occur. Some grazers are also known to include browse during the dry season when the quality of grass declines, thereby increasing pressure on this limited resource. As a result of the deciduous nature of the woody species in the reserve the browse resource becomes critically limited during the late dry season. Since migration to alternative food resources is prevented by the fences, condition loss or even mortalities of these game species are anticipated in this small fenced area if supplementary feeding is not provided during the critical period. This conclusion is supported by the popularity of the feeding area and the apparent dependence of the browser and mixed feeder game species on the supplementary feeding. Faecal nitrogen levels of animals receiving supplementary feeding were above known critical levels, except for kudu. It is important to determine from the presence of leaves on trees, when to supply feed in order to prevent financial losses for such a small game ranch.

**NOTES:**

## POSTER PRESENTATION: HABITAT UTILIZATION OF WHITE RHINOCEROS (*CERATOTHERIUM SIMUM*) IN THE WILLEM PRETORIUS GAME RESERVE

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The Willem Pretorius Game Reserve is located in the Free State Province and is approximately 12 091 ha in size. Although a management plan for the white rhino population exists no research has been done to date on their ecology and habitat utilisation in the reserve. Game species occupy and utilize diverse plant communities for different activities such as sleeping, feeding and reproduction. It is therefore important that the plant communities of the home range of an animal be studied as the basis of the animal's requirements. This study is part of a larger project on the ecology and behaviour of white rhinos in the reserve and as a first step in developing guidelines to manage these animals in smaller reserves and game farms in the Free State Province.

The aim of this study was to determine the habitat utilisation of white rhinoceros in the Willem Pretorius Game Reserve in the Free State Province. The study was conducted over a two year period and included Braun-Blanquet vegetation surveys within the home range of the white rhinoceros, while daily observations regarding the location and activities of the rhinos were recorded. A total number of 40 sample plots (400 $m^2$) were placed in the home range of the rhinos in a stratified random basis using 1:10 000 ortho photos. The vegetation data was analysed using the TWINSPAN multivariate classification technique. Rhinos were followed on a monthly basis for 96 hours at a time over a period of four years (2007-2008). The GPS coordinates (n=249) were mapped on the ortho photos with the use of ArcView to determine the habitat preferences and utilisation of the rhinos.

The results indicate that during the dry season white rhinos had a preference for trees and shrubs of the *Acacia karroo-Grewia occidentalis* midslope Woodland on the higher-lying areas while they preferred the *Cynodon hirsitus* dam edge Grassland and *Acacia karroo-Setaria verticillata* dense Woodland on the lower-lying areas next to the dam during the wet season. During the dry season the lactating cows moved deep into the thickets located between steep cliffs and in gullies in order to feed on green grasses such as *Panicum maximum* and *Enneapogon scoparius* that survived the frost by being protected under trees and shrubs. The rhinos did not utilize all plant communities within their home range equally. Wetlands provided a few green grasses throughout the year due to the seepage effect and simultaneously provided warm protected areas during the winter months, but were generally the least utilised areas due to the

dominance of tall unpalatable grasses such as *Eragrostis rotifer, Eragrostis plana* and *Sporobolus africana*. The results of this study indicate that the white rhinos mostly preferred the short grass communities with the grasses *Cynodon hirutus, C. dactylon, Enneapogon scoparius* and *Aristida spp.* being the most preferred species.

**NOTES:**

## PLATFORM PRESENTATION: SEASONAL FLORISTIC CHARACTERISTICS OF FORAGING PATCHES OF WHITE RHINOCEROS (*CERATOTHERIUM SIMUM SIMUM)* IN THE SONGIMVELO NATURE RESERVE, MPUMALANGA PROVINCE

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Forage patch selection by White Rhinoceros in the Songimvelo Nature Reserve was investigated during the late wet (January to March) and late dry seasons (June to August) of 2008. The aim of the study was to describe the floristic attributes of the selected patches in both seasons relative to neighbouring control patches.

Forage patches were identified by locating Rhinos and observing their feeding behaviour (n = 21 for wet season, n = 19 for dry season). Floristic information was recorded in both the experimental plots (feeding patch) and control plots (located 50 m from the experimental plots, situated within the same plant community). A two-way ANOVA, using three replicates, indicated that grass species density between experimental (Exp.) and control (Ctrl) plots were significantly different in the late wet season (Exp = 19 ± 25; Ctrl = 14 ± 12 ) and the late dry season (Exp = 15 ± 16; Ctrl = 12 ± 15).

The grasses with the highest densities in the late wet season and also selected by the White rhinoceros included *Heteropogon contortus*, *Cynodon dactylon*, *Eragrostis spp.* and *Bothriochloa insculpta* compared to *Heteropogon contortus*, *Setaria sphacelata* and *Hyparrhenia hirta* in the late dry season. The density (number $m^{-2}$) of grass species in the height class 0 - 10 cm in the experimental (18.60 ± 2.97) plots were higher compared to the control (13.81 ± 1.45). Grass phytomass showed a significant difference between the late wet (1313.71 ± 60.85) and late dry seasons (1060.92 ± 55.26) and a significant difference between experimental (1051.57 ± 58.38) and control (1332.42 ± 57.88) plots. The woody component showed a high proportion of dwarf shrubs (≤ 1 m in height) in both experimental (Late wet = 0.75; Late dry = 0.83) and control (Late wet = 0.70; Late dry = 0.71) plots across both seasons but showed a lower proportion of trees (> 2 m in height) in experimental plots (Late wet = 0.10; Late dry = 0.03) than in control plots (Late wet = 0.14; Late dry = 0.14).

This study shows that White Rhinoceros prefer foraging in open areas and select patches with an abundance of preferred short grass species. This requires a careful consideration of the carrying capacity of the area because that can have a significant effect on the vegetation composition and species diversity of the selected areas.

**NOTES:**

# PLATFORM PRESENTATION: DIET AND FEEDING ECOLOGY OF COMMON WARTHOG IN THE ADDO ELEPHANT NATIONAL PARK

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The common warthog (*Phacochoerus africanus)* has been recognised as an alien species in the Eastern Cape and their population is increasing rapidly within the region. This raises a concern as invasive species can have negative impacts on both economic and ecological aspects of biodiversity. A few studies have documented the impacts of this species in the Eastern Cape. This study aimed to determine the diet of common warthog in the Addo Elephant National Park (AENP) Main Camp. As warthogs are specialized grazers, it was hypothesized that they may have a potential deleterious impact on grazing resources. Diet was determined through microhistological analysis of faecal material from samples collected seasonally.

Grasses formed the largest percentage (87.4%) of warthog diet, with *Cynodon dactylon* contributing the greatest percentage of grasses throughout the seasons. Forbs contributed a small amount to the diet, followed by woody shrubs and finally succulents. There was little variation in the contribution of growth forms between seasons. In autumn there was a small decline in grass consumption, and this was compensated for by higher intake of browse. The increase of browse intake and number of plant species eaten during dry seasons may be explained by the decline in the relative availability and lower nutritive value of grass during dry seasons. Warthog selected certain grass species in greater quantities than other species, and these species can potentially be used as indicators to monitor their grazing impacts. Invader species do not always modify the entire ecosystem but they can drastically affect specific plant or animal species by feeding upon these species to the point of its extinction. This demonstrates that certain plant populations, for example low frequency grasses, may be at risk of extinction through warthog diet selection in the AENP Main Camp. The results of this study also showed that the diet of the warthog overlaps with that of other herbivores in the AENP Main Camp (i.e. zebra, buffalo & red hartebeest) and highlights the possible role of warthogs as a competitor for these indigenous species.

Warthog have the potential to affect compositional diversity of plants as they grazed largely on grasses and a few other plant species. They have also shown resource overlap with other herbivores co-existing with them. This could result in warthogs having impacts on other herbivores through resource competition. The results of this study adds further weight to the suggestion that common warthog is an invasive species in the Eastern Cape. Given the core function of conservation areas to exclude threats to biodiversity and the fact that invasive species have been shown to play a major role in species extinctions (Caughley 1994), it is recommended that active eradication of warthog in Eastern Cape conservation areas, including AENP, should take place.

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