

TIME	TITLE	AUTHOR/S
POSTER SESSION: Animals and Forage (Session Chair: Erika A van Zyl)		
14:00-14:05	The seasonal variation of diet of the Cape buffalo (<i>Syncerus caffer</i>) in the Great Fish River Reserve	Thulani Tshabalala, Sikhalazo Dube and Peter C Lent
14:05-14:10	Browse quality of <i>Acacia karroo</i> trees as affected by spring heavy defoliation and debarking in the False Thornveld of the Eastern Cape	Mfundo Macanda, Sikhalazo Dube and Craig Trethewey
14:10-14:15	The effect of browsing on growth, structure and physiological aspects of <i>Grewia flavescens</i> and <i>Dichrostachys cinerea</i> at the Nkuhlu Exclosures, Kruger National park: A proposal	B Patricia Shabangu, Peter F Scogings and Alpheus M Zobolo
14:15-14:20	Effects of browsing on growth, structure and physiological aspects of <i>Acacia grandicornuta</i> and <i>Combretum apiculatum</i> at the Nkuhlu Exclosures, Kruger National Park: a proposal	C Thandeka Mamashela, Peter F Scogings and Alpheus M Zobolo
14:20-14:25	Productivity of <i>Pentzia incana</i> and <i>Nenax microphylla</i> in two soil types	Paul J Malan
14:25-14:30	Water utilization of cactus pears <i>Opuntia ficus-indica</i> and <i>O. robusta</i>	Hennie A Snyman
14:30-14:35	Feeding value of common market crop wastes for goat production in urban and periurban production systems in Kampala, Uganda	Constantine B Katongole, Elly N Sabiiti, Felix B Bareeba and Inger Ledin
14:35-14:40	The performance of indigenous goats on forage chicory	Doreen Z Ndlovu, Alan D Short and Sheila D Househam
14:40-14:45	Production of sheep on fodder radish	Alan D Short, M William Diko and John M Cunningham
14:45-14:50	The effects of low-cost diets on average daily gain (ADG) and carcass weight of rabbits in city belts	Otilia H Tamele, Cristiano da Conceição and Damião W Nguluve

Animals and Forage

SESSION CHAIR: ERIKA A VAN ZYL

Poster Presentations

THE SEASONAL VARIATION OF DIET OF THE CAPE BUFFALO (*SYNCERUS CAFFER*) IN THE GREAT FISH RIVER RESERVE

Thulani Tshabalala[#], Sikhalazo Dube and Peter C Lent*

University of Fort Hare, Department of Livestock and Pasture Science, Private Bag X1314, Alice, 5700, South Africa, email: sdube@ufh.ac.za

Rangelands are characterized by patchiness in the quality and quantity of forage resulting from spatial and temporal variation. Ungulates utilizing these rangelands require a minimum intake of nutrients to satisfy their nutritional requirements. Understanding the variation in food resources of herbivores is useful in explaining animal movements, the habitat types selected and population dynamics. A study is being carried out in the Great Fish River Reserve (GFRR), Eastern Cape, to investigate the diet profile of the Cape buffalo (*Syncerus caffer*). The objectives of the study are to determine the extent to which buffalo change their diet profile in response to changes in rainfall and to investigate the effects of changes in availability and quality of forage found at the GFRR on the diet composition and quality of the feed the buffalo chooses. Microhistological technique is being used to determine the changes in diet composition based on fresh fecal matter collected monthly. Common grasses and browse specimens have been collected to make a photographic reference collection of their cuticles. The grass phytomass fluctuation is being monitored through clipping of 40 quadrats (1m²) at each of the two locations which have a high grass biomass, one at a low elevation and one at a high elevation. Basal cover and sward height data are being collected at each location. Attempt to use the disc pasture meter failed as



the vegetation is too thick. Nitrogen analysis is being done monthly on fecal samples and on the ten most common grasses to determine dietary and forage quality respectively. Sampling will be conducted through one full cycle of rainy and dry seasons. For the statistical analysis a log linear regression analysis will be performed to determine the extent to which buffalo change their diet profile, having the monthly rainfall as a predictor and the diet composition of the buffalo as the response. A correlation of diet composition and forage quality will be tested.

BROWSE QUALITY OF ACACIA KARROO TREES AS AFFECTED BY SPRING HEAVY DEFOLIATION AND DEBARKING IN THE FALSE THORNVELD OF THE EASTERN CAPE

Mfundo Macanda^{1}, Sikhhalazo Dube² and Craig Trethewey³*

¹Eastern Cape Department of Agriculture, Döhne ADI, Stutterheim, 4930, South Africa, e-mail mfundo@Döhne.agric.za, mcmfu@yahoo.co.uk, ²University of Fort Hare, Department of Livestock and Pasture, Faculty of Agriculture, Private Bag X1314, Alice, 5700, South Africa, email: sdube@ufh.ac.za, ³Eastern Cape Department of Agriculture, Adelaide Experimental Farm, PO Box 142, Adelaide, 5760, South Africa, email: cat01@telkomsa.net

The research trial was initiated in 2004 at Adelaide Experimental Farm in the False Thornveld of the Eastern Cape. Two factors were investigated in the trial; defoliation (heavy and no defoliation) and debarking (complete basal ringing, half basal striping and no debarking). Defoliation was carried out using goats and debarking was done manually using a knife. The treatments were applied immediately after first spring rains, when the trees were actively growing. The fenced area of 1.62 ha, was sub-divided into 18 plots. Half of the area was stocked with 12 goats for 1 week and thereafter it was stocked with 6 goats for the following 1 week. The trees were debarked on the first week after each camp was severely defoliated. The data in trial was collected at the end of two growing seasons May 2005 & 2006. The data was analyzed using General Linear Modeling of SPSS. Spring defoliation had no significant effect on all the variables that constitute forage quality. Debarking had a significant effect on the levels of tannin and NDF ($P < 0.01$), but other factors were not significantly different. The combination of both debarking and defoliation had no significant effect in all the variables. Basal ringing resulted in lower levels of tannin and high level of NDF. Reduced tannin levels are found on the new shoots that come up as the results of coppicing in the ring barked trees. In the case of coppice growth defense is sacrificed for growth in nutrient rich soil as the increase in NDF.

THE EFFECT OF BROWSING ON GROWTH, STRUCTURE AND PHYSIOLOGICAL ASPECTS OF GREWIA FLAVESCENS AND DICHROSTACHYS CINEREA AT THE NKUHLU EXCLOSURES, KRUGER NATIONAL PARK: A PROPOSAL

B Patricia Shabangu^{}, Peter F Scogings and Alpheus M Zobolo*

University of Zululand, Department of Agriculture, Private Bag X1001, KwaDlangezwa, 3886, South Africa, email: thabileshabangu@yahoo.com, pscoging@pan.uzulu.ac.za, azobolo@pan.uzulu.ac.za

To investigate (1) growth, (2) structural, and (3) physiological responses of plants to browsing, a study will be conducted at the Nkuhlu Long-Term Experimental Exclosure, Kruger National Park, using *Grewia flavescens* and *Dichrostachys cinerea* trees of heights from 1m-1.5m. It is assumed that growth rate and concentrations of defences are inversely related, but that this is affected by resource availability. The experimental site includes a total exclosure, elephant exclosure and control, all of which incorporate the catena from sodic footslopes to sandy crests. In each treatment, 10 trees per species will be marked and sampled to estimate structural (thorns), chemical (phosphorus, nitrogen, neutral detergent fibre, acid detergent fibre, acid detergent lignin and tannin concentration), physiological (photosynthesis) and growth traits on the footslope and lower midslope. Leaves will be collected from 10 individuals per species per treatment for chemical analysis in the early, mid and late wet season. Another experiment will be conducted at the University of Zululand using 100 *Dichrostachys cinerea* seedlings, obtained from the Skukuza Nursery, to test resource allocation in browsed plants, with water being the limiting resource. Plants will be separated into 3 groups and watered at different times of the week (once, twice and daily). They will be fed to goats for given times to achieve a range of browsing intensities determined by weighing the plants before and after they are browsed. Plants will be left to regrow (5 months), harvested thereafter, and dried. Plants will then be separated into stem, thorns, leaves and roots. Each of the plant parts will be weighed. The leaves will be analysed for nitrogen (N), neutral detergent fiber (NDF), and condensed tannins (CT). Relationships between growth and defence responses and browsing intensity, as affected by water availability, will be analysed with



correlation analysis. The knowledge gained from this study will be useful to build models of browse-browser interactions for these species in savannas as part of the seasonal, subtropical zone where browsers are abundant and have the potential to either deplete or control invasive woody plants.

EFFECTS OF BROWSING ON GROWTH, STRUCTURE AND PHYSIOLOGICAL ASPECTS OF ACACIA GRANDICORNUTA AND COMBRETUM APICULATUM AT THE NKUHLU EXCLOSURES, KRUGER NATIONAL PARK: A PROPOSAL

C Thandeka Mamashela^{,} Peter F Scogings and Alpheus M Zobolo*

University of Zululand, Department of Agriculture, Private Bag X1001, KwaDlangezwa, 3886, South Africa,
email: mamashelas@webmail.co.za, pscoging@pan.uzulu.ac.za, azobolo@pan.uzulu.ac.za

Plants have considerable ability to respond to herbivory, by regrowth, increased structural defenses (e.g., spines) or chemical defences (e.g., tannins). It is assumed that growth rate and concentrations of defences are inversely related, but this will be affected by resource availability. For that reason, research will be conducted to investigate the effect of browsing on growth, structure and physiological responses of *Acacia grandicornuta* and *Combretum apiculatum* at the Nkuhlu Long-Term Experimental Exclosures at different times of year. The experiment includes a total exclosure, elephant exclosure and control, all of which incorporate the catena from sodic footslopes to sandy crests. Individuals of both species 1-1.5m tall will be sampled inside and outside the exclosure, within 150m of the boundary between the foot and crest where browsing is concentrated. To estimate growth rate, shoot length, shoot diameter, leaf length and thorn length will be measured fortnightly on 10 plants per species per treatment early in the wet season. Photosynthetic rate will also be measured on the same plants at the same time as shoot growth. Leaves will be collected from 10 individuals per species per treatment for chemical analysis (phosphorus, nitrogen, neutral detergent fibre, acid detergent fibre, acid detergent lignin and tannin concentration) in the early, mid and late wet season. To test how resources are allocated in *C. apiculatum* after browsing, an experiment will be set up at the University of Zululand in October. Trees from Skukuza nursery (100 seedlings) will be used. They will be fed to goats for given times to achieve a range of browsing intensities by weighing the plants before and after they are browsed. The browsed trees will be divided into three groups and given water daily, biweekly and weekly, and allowed to grow for five months. Plants will be harvested, dried and separated into roots, stems, thorns and leaves, which will be weighed. Leaves will be chemically analysed. Relationships between growth and defence responses and browsing intensity, as affected by water availability, will be analysed with correlation analysis. By contributing to the knowledge required for improving the understanding of factors affecting tree-browser interactions in savannas, the development of management and conservation strategies for people living in savannas will benefit.

PRODUCTIVITY OF PENTZIA INCANA AND NENAX MICROPHYLLA IN TWO SOIL TYPES

Paul J Malan

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

It is taken for granted that Karoo shrubs are well adapted to only the soils and climate of the Nama Karoo biome. The easterly movement of Karoo vegetation into the Grassland biome is however well documented, while ecosystems responses to global climate change are a new debate. A pilot trial was therefore conducted as part of a larger trial to determine the production and adaptability of *Nenax microphylla* (Daggapit) and *Pentzia incana* (Ankerkaroo) on two different soil types. The one soil type was collected from Grootfontein Agricultural Development Institute at Middelburg Eastern Cape in the Nama Karoo biome (a Valsrivier form - 40% clay content), while the other soil type was from Bloemfontein in the Grassland biome (a Bainsvlei form - 14% clay content). The plants were collected at Middelburg in the Nama Karoo. One plant of each species was vegetatively multiplied by means of stem cuttings. This means that six clones of each species were used and therefore the different plants of each species were genetically identical. Three plants of each species were planted in each soil type in pots in a glasshouse. Pots were watered once a week with the same volume of water. Productivity was evaluated in terms of both above- and belowground development over a six month period. Total aboveground dry matter (DM) production of *Pentzia incana* and *Nenax microphylla* was respectively 11% and 20% higher on the Grassland soil than on the Karoo soil. Root development and production of both species was



significantly ($P < 0.01$) higher in the Grassland soil with the lower clay content. Plants in the Grassland soil wilted earlier than those in the Karoo soil. Other than expected, plants generally grew better on the Grassland soil than on the Karoo soil, which might be ascribed to the better root development in the Grassland soil as well as its higher nutritional value.

WATER UTILIZATION OF CACTUS PEARS *OPUNTIA FICUS-INDICA* AND *O. ROBUSTA*

Hennie A Snyman

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

With the global climatically changes experiencing over the world, it is important for the rainfall to be used in the most efficient way and by the correct plants. *Opuntia* species (cactus pear) is known in some areas of the world as the “bridge of life” because, during periods of low rainfall, it is one of the few crops that can be used as both human food and cattle feed. Commercial cultivation of cactus pear in South Africa is a recent undertaking. Unfortunately there is a lack of knowledge on water utilization (WU) of cactus pear at community level under field conditions over a whole growing season. From an agronomical point of view, this kind of information is of great significance, both in theory and in practice.

The WU (cladode dry-mass production per unit of evapotranspiration) was quantified for one to four-year-old *Opuntia ficus-indica* (L.) Miller (cultivar Morado, green cladode) and *O. robusta* Wendl. (cultivar Monterey, blue cladode) plants, in a semi-arid climate. *Opuntia ficus-indica* that regularly thrives in deep alluvial soils is one of the most important domesticated varieties of *Opuntia*, while *O. robusta* is one of the most important wild species that grow in infertile and shallow soils.

Evapotranspiration of *O. ficus-indica* was over all four seasons higher ($P > 0.05$) than that of *O. robusta*. The water content in the cladodes ranged for *O. ficus-indica* between 88.02 and 88.21% and for *O. robusta* between 87.25 and 87.52%. Both *Opuntia* species showed an enormous increase in biomass production and WU from the one to four-year-old plants. The mean cladode fresh mass for the four growing seasons were 1 299 g cladode⁻¹ for *O. ficus-indica* and 1 091 g cladode⁻¹ for *O. robusta*. The four-year-old plants produced as much as 9 665 and 8 378 kg dry mass ha⁻¹ for *O. ficus-indica* and *O. robusta* respectively. The biomass production and WU for all four growing seasons of *O. ficus-indica* plants were significantly ($p \leq 0.01$) higher than that of *O. robusta*. After four years of establishment, *Opuntia ficus-indica* produced as much as 17.26 kg DM ha⁻¹ for each mm of water used, comparing to a WU of 14.96 kg DM ha⁻¹mm⁻¹ obtained for *O. robusta*.

These above-mentioned characteristics of the cactus pear make it more appropriate for arid and semi-arid crop production. The results also show that more complex measures of environmental variability may be required to fully understand cactus pear dynamics and to increase the accuracy of predictions of cactus pear responses to global climatic change. It can provide feed for livestock when it is urgently required in the drier areas.

FEEDING VALUE OF COMMON MARKET CROP WASTES FOR GOAT PRODUCTION IN URBAN AND PERIURBAN PRODUCTION SYSTEMS IN KAMPALA, UGANDA

Constantine B Katongole^{2#}, Elly N Sabiiti^{1*}, Felix B Bareeba² and Inger Ledin³

¹Makerere University, Department of Animal Science, PO Box 7062, Kampala, Uganda, email: esabiiti@agric.mak.ac.ug, ²Makerere University, Department of Crop Science, PO Box 7062, Kampala, Uganda, email: tbakyuka@agric.mak.ac.ug, ³Swedish University of Agricultural Sciences, Department of Animal Nutrition and Management, PO Box 7024, 750 07, Uppsala, Sweden

Four common crop wastes: banana leaves, banana pseudo-stem sheaths, sweet potato vines and wastes of *Solanum aethiopicum* (traditionally known as *nakati*) were collected from one of the major markets in Kampala, and their feeding value to goats evaluated by chemical composition (during the dry and wet seasons), rumen degradation and digestibility in intact growing male goats. Mean dry matter (DM) content was 9.4, 11.9, 18.0 and 21.7% for pseudo-stem sheaths, *nakati*, sweet potato vines and banana leaves, respectively. Crude protein (CP) was 3.5, 11.7, 14.0 and 14.2% for pseudo-stem sheaths, banana leaves, *nakati* and sweet potato vines, respectively. Chemical composition was similar across the dry and wet seasons for banana leaves and pseudo-stem sheaths. However, for sweet potato vines and *nakati*, the wet season wastes had significantly



($P < 0.05$) higher CP and lower neutral detergent fiber (NDF) and acid detergent lignin (ADL). DM degradability was highest ($P < 0.05$) for sweet potato vines (83.2%), followed by *nakati* wastes (65.4%), pseudo-stem sheaths (55.3%) and least for banana leaves (50.1%). Average DM intake was 166, 271 and 532 g day⁻¹, while CP intake was 24, 30 and 60 g day⁻¹ for *nakati*, banana leaves and sweet potato vines, respectively. CP digestibility for banana leaves was low (43%), while it was relatively high for sweet potato vines (66%) and *nakati* (72%). N retention (as a fraction of N intake) was -0.51 (banana leaves), 0.35 (sweet potato vines) and 0.44 (*nakati* wastes). This study showed that *nakati* and sweet potato vine market wastes are potential goat feed resources especially where standard feed resources are scarce. However, their successful use should adhere to timely collection before they get contaminated with other undesirable materials in the markets. The acceptability of *nakati* wastes by farmers and its nutritional quality may be compromised by the need to wash them first before they are fed. They should also be wilted sufficiently; otherwise their high moisture content restricts DM intake.

THE PERFORMANCE OF INDIGENOUS GOATS ON FORAGE CHICORY

Doreen Z Ndlou^{1*}, Alan D Short¹ and Sheila D Househam²

KwaZulu-Natal Department of Agriculture and Environmental Affairs, Grassland Science, Cedara, Private Bag X9059, Pietermaritzburg, 3200, South Africa, ndlovud@dae.kzntl.gov.za, alan.short@dae.kzntl.gov.za,
²PO Box 38, Swartberg, 4710, South Africa

For the past seven years, the performance of indigenous goats under intensive cultivated pasture management systems has been evaluated, with a view to improving goat production in KwaZulu-Natal. One of the forage species evaluated was forage chicory (cv. Lacerta). Maiden ewes were stocked at three unreplicated stocking rates (50, 60 and 70 goats per hectare), from 5 June 2003 to 5 February 2004 (244 days), and from 23 September 2004 to 1 February 2005 (131 days). Performance varied considerably between treatments. In 2003, the ADG was significantly greater at the low stocking rate (0.071 kg day⁻¹) than at the medium (0.060 kg day⁻¹) and high stocking rate (0.061 kg day⁻¹). There was some difference between seasons in production per hectare, mainly because of the differing lengths of season: 2003 ranged from 868.80 kg ha⁻¹ to 1043.40 kg ha⁻¹ at high stocking rate and in 2004 production rate per ha ranged from 381.17 kg ha⁻¹ to 455.13 kg ha⁻¹ to 833.63 kg ha⁻¹, but again the medium stocking rate performed more poorly than the other two stocking rates. Chicory has a tendency of growing into stems which are not well grazed by animals. Chicory also may have anthelmintic effects, as the animals on the trial were only dewormed once; this aspect must be investigated further. There were few cases of foot rot and feet abscesses. Chicory is a high potential crop that can be utilised for a long period of time, through the winter and summer.

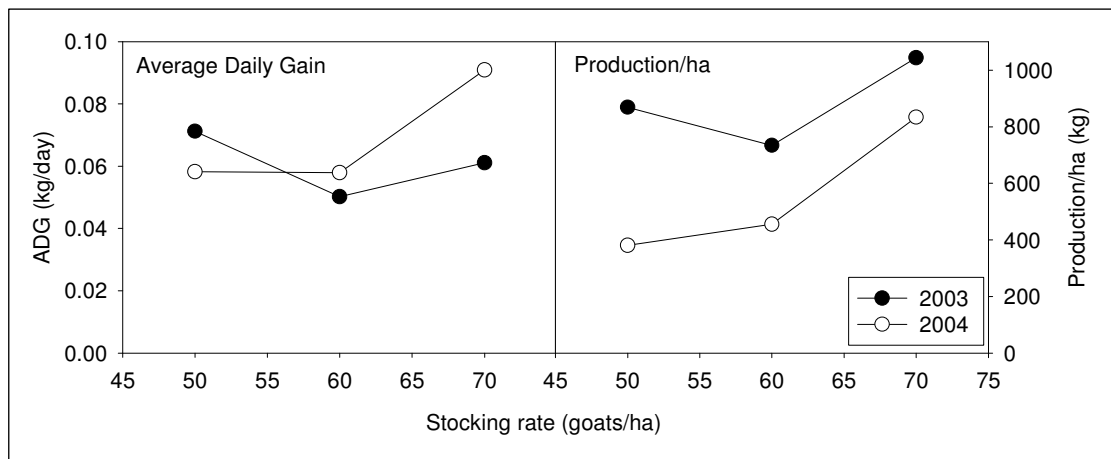


Figure 1: Average Daily Gain (kg.day⁻¹.animal⁻¹) (left) and production per hectare (kg) (right) for Nguni goats grazing forage chicory. Note that the 2003 season was 244 days from June – February, and the 2004 season was 131 days from September to February.



PRODUCTION OF SHEEP ON FODDER RADISH

*Alan D Short**, *M William Diko[#]* and *John M Cunningham*

KwaZulu-Natal Department of Agriculture and Environmental Affairs, Grassland Science, Cedara, Private Bag X9059, Pietermaritzburg, 3201, South Africa, email: alan.short@dae.kzntl.gov.za

The performance of merino sheep fed fodder radish was evaluated at Kokstad Research Station from 9 June 2006 to 8 September 2006 (91 days). Three treatments were applied: sheep were fed 5%, 10% and 15% (2 kg, 3.9 kg and 6 kg per sheep per day respectively) of their mean body weight in fresh radish daily, with eragrostis hay fed *ad lib*. Ten sheep were allocated to each treatment. After a two-week period of adjustment, during which the sheep lost weight, sheep gained weight from the 30 June 2006 (mean weight 38.16 kg). Treatment had no effect on ADG, with all sheep gaining 42 g.day⁻¹, to a final weight of 42.67 kg (F prob 0.909, 2 d.f.). There was some waste of radish fed to the high radish treatment, indicating that this treatment (i.e. 15% of body weight of radish fed per day) is not economically viable. Weaned merino Sheep grazing radish planted into stouling rye gained 202 g/day for 85 days, from 15 June 2006 to 8 September 2006. On that camp, the stocking rate was increased by 50% to 16 sheep/ha after the first two weeks, as it was apparent that the initial stocking rate of 10 sheep/ha was too low. Sheep performed well on radish, and further investigations into optimum grazing and feeding systems are required.

THE EFFECTS OF LOW-COST DIETS ON AVERAGE DAILY GAIN (ADG) AND CARCASS WEIGHT OF RABBITS IN CITY BELTS

Otilia H Tamele, *Cristiano da Conceição* and *Damião W Nguluwe[#]*

National Agricultural Research Institute, Directorate of Animal Science, Caixa Postal 1410, Maputo, 258, Mozambique, email: otiliatmele@yahoo.com.br, ngudamiao@yahoo.com

The rabbit (*Oryctolagus cuniculus*) species is very prolific, fast growing with a short reproductive cycle that can be raised in small and local infrastructures on the back yard garden. The main constraint is the feeding component, mainly if the farm relies on concentrated rations. This study was undertaken on small scale farm at Matola Village, Southern Mozambique. The objectives were to test different feeding alternatives, for live and carcass weight gain (LWG and CWG) and production cost. The treatments were wheat bran plus *Moringa oleifera* (WBM), wheat bran plus sweet potatoes (*Ipomea batatas*) (WBI), and wheat bran plus *Amaranthus reflexus* leaves and pods (WBA), as compared to commercial ration (control). 20 animals with 30 days old and approximate weight (500 to 700 g) and randomly distributed in individual feeding boxes with drinking water and feeding pen were tested during 60 days, after one week of adaptation and coccidiosis treatment (Sulphadiazina plus Thrimethoprin, 125 g). *Moringa oleifera*, *Ipomea batatas* and *Amaranthus reflexus* wilted leaves (25% of the main diet), and estimated on the dry matter (DM) voluntary intake (*ad libitum*) for the species (6.7% of live weight). There were significant differences (P=0.05) on LWG and CWG between treatments, 26.7, 20.7, 14.5 and 19.4g and 76.5, 75.9, 73.1 and 74.5, respectively. *Moringa* based diet average 22.5% less compared to the commercial diets, and outyielded 36.5% compared to the average of *Amaranthus* plus *Ipomea*. There was a linear correlation between the rabbit diets and the LWG, and diet cost also differed slightly between treatments, 4.2, 1.2, 0.97, and 1.2 US Dollar for commercial ration, *Moringa oleifera*, *Amaranthus reflexus* and *Ipomea batatas*, respectively.

