Dedication

To my father

To my mother

To My brothers

To My sisters

To my wife

To my sons

To my daughters

To My colleagues and friends

To my supervisors

To all those

I dedicate this humble work.

Declaration

The study presented in this thesis was completed by the author whilst he was a postgraduate student at the College of Graduate Studies and Scientific Research, Sudan University of Science and Technology.

I herby affirm that the content of this thesis is original research conducted by the author. All views and conclusion are the sole responsibility of the author. All references to previous work are included at the end of the thesis.

I certify that the content of this thesis has not already been submitted for any degree and is not being currently submitted for any other degree.

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Abstract

The study was conducted in different locations in Butana area (Gadarif, Showak, Sharif Hassab Allah , um-gargoor, Alsobagh). The study aim to determine the effect of breed types, sex and age group on somebody measurements of some Sudanese breed type's camel, also to assess some field management practices adopted by herder men and camel owners.

Milk samples from 60 she-camels (*Camelus dromedaries)* in different parity numbers (one to fifth) and in different breed types (Anafi n=10, Kenana n=20, Daili n=12 and Arabi n=18) were randomly collected in June 2013 to investigate the effect of parity and breed types on some physicochemical components of camels milk. The effect of parity and breed types on milk yield and components were investigated by ANOVA test followed by multiple comparisons using (LSD) test and the relation of difference components of camel milk were calculated using Pearson correlation. The data of present study was analyzed by using SPSS. Milk yield, fat, SNF and protein were affected by parity number ($P<0.05$). Significant differences ($P<0.05$) of breed types were recorded in freezing point, conductivity, milk yield, fat, lactose, ash, SNF and protein. The results showed strong positive correlation ($P<0.01$) in density, freezing point, Fat, SNF, lactose, ash and protein. But between fat and lactose, fat and ash were positively correlated ($P<0.05$). The correlation of each parameter with the added water and conductivity was negatively highly significant ($P<0.01$).

Also the study was used two hundred and eighty head were to five breed types of Sudanese camel (Bishari, Arabi, Daili, Anafi and Kenani) were randomly selected from Gadarif state. The purpose of this part of the study was to determine the effect of breed types, sex and age group on some body measurements of the five Sudanese breed types camel. Body measurements were taken using metric tape (height at wither, heart girth, barrel girth, neck length, face length, tail length,

and body weight). Complete Randomized Design was used to analyze the results obtained from this part of study and subjected to General Linear model (GLM) followed by Least significant difference test (LSD) using the SPSS 20.0 computer program, as 5 X 2 X 4 factorial design averages of height at wither, heart girth, barrel girth, neck length, face length, tail length and body weight were 1.85±0.02 m, 2.02±0.02 m, 2.52±0.02 m, 1.13±0.01 m, 58.84±0.28 cm, 68.60±0.42 cm and 512.30±7.84 kg respectively. The results also revealed that body measurements were significantly affected by type of camel and age group. The Kenani camel showed the highest values in all studied body measurements followed by other breed types. Regarding to the age groups the camels in the fourth age group (8 to 9 years) had significantly high values in all body measurements followed by those of the third group 10 to 12 years, while the animals in the first group ≤ 4 years recorded the lowest values. Furthermore, the results showed that the sex of camel significantly affected the heart girth, face length and body weight; and the males had significantly higher ($P< 0.05$) values than those of females.

Also a set of detailed structured questionnaires were used to collect information from a total of sixty camel owners in different locations in Butana area in interview conducted over single visit. The questionnaire was designed to obtain information on general household information, relation with camel and life mode of camel owners, purposes of keeping and rearing camels, breeding practices, milk production and milking practices, feeding and watering and constrains of camel production and veterinary services. This part of study was revealed that most of camel owners was illiterate, practiced both rearing camels and agriculture and had experience more than 20 years in camel rearing as professions also they bred camel as life manner the results showed that camel owners select their animals according to breeding history, followed by productivity and morphological features moreover they focused on milk and meat improvement purposes and the majority of them kept the male from the same herd and prefer to

bred Arabi, Daili, and Anafi breed type. More than half percent of camel owners select their male at 6 years age and keep it until 15 years. The results showed that most of she-camel produced from 2 to 3 kg milk/day in lactation period of 10 months, the majority of camel owners used calve in milk let down and they milked she-camels twice a day, also the majority consumed the produced milk, while view of them 3 sold the produced milk and took the milk for calve. The study showed that the main source of camels feed was the pastures and the camels preferred to eat trees, bushes and grasses. Also the result showed that the main source of water is river, wells 3and natural water net . The results showed that the majority of camel owners watering their camels in summer every three, while in winter more than half percent of camel owners watering their camels every six days. The main constrain of camel production was diseases, followed by the lack of feed, water.

مستخلص البحث

أجريت الدراسة في مناطق مختلفة في منطقة البطانة (القضارف، الشواك، شريف حسب الله، أم قرقور والصباغ. هدفت الدراسة الى تحديد تأثير النوع والسلالة والعمر على بعض قياسات الجسم ومكونات الحليب لبعض سلالات الإبل السودانية، اضافة الى تقييم بعض الممارسات الحقلية لملاك الإبل. تم اخذ عدد من عينات الحليب من 60 من النوق (ذوالسنام الواحد) بعدد ولدات مختلفة (1-5) وعدد سلالات مختلفة (عنافي ن 10= ، كناني ن=20 ، دعيلي ن 12= وعربي ن= 18 (تم جمعها عشوائياً في شهر يوليو 2013 لمعرفة تأثير الولدات ونوع السلالة على بعض المكونات الفيزويوكيميائية للبن الإبل. تم التأكد من تأثير عدد الولدات ونوع السلالة على إنتاج الحليب ومكوناته بواسطة إختبار نوفا يليها إستخدام جداول المقارنات العديد بإستخدام إختبار الفروقات المعنوية، وإختلاف العلاقة في مكونات اللبن تم حسابها بإستخدام إرتباط بيرسون،تم تحليل بيانات الدراسة إحصائياً : إنتاج الحليب،الدهون،الموادالصلبة الغيردهنية والبرتين، تتأثربواسطة عددالولدات ($p< 0.05$) الإختلاف الكبير في نوع السلالة تم تسجيلها في درجة التجمد،التوصيلية،إنتاج اللبن،الدهون،اللاكتوز،الرماد،المواد الصلبة الغيردهنية والبروتين . أوضحت النتائج إرتباط أيجابي قوي ($p< 0.01$) في الكثافة، التجمد، الدهون، الموادالصلبة الغيردهنية ،اللاكتوز، الرماد والبروتين . ولكن بمقارنة الدهون مع اللاكتوز والدهون مع الرماد أظهرت إرتباط إيجابي ($p^{<}0.05$). كان الإرتباط في كل معامل ات عند إضافة الماء والتوصيلية أكثرسلبية ($p^{<}0.01$). أيضاً الدراسة إستخدمت 280 رأس تنتمي إلي خمسة أنواع من سلالات مختلفة من الإبل السودنية(كناني ،عنافي، دعيلي،عربي وبشاري) تم إختيارها عشوائياً من

ولايةالقضارف .هدف هذا الجزء من الدراسة هو تحديد تأثيرعدد الولدات ،الجنس والعمرالفئوي على بعض القياسات لخمسة أنواع من سلالات الإبل السودانية، قياسات الجسم أخذت بواسطة الشريط المتري (الطول عند الكتف، محيط الصدر، محيط البطن، طول الرقبة، طول الوجه، طول الذيل ووزن الجسم).إستخدم التصميم العشوائي المتكامل لتحليل النتائج المتحصل عليها في هذا متبوعاً الجزء من الدراسة وأخضعت للنموزج الخطي العاملي بإختبار الفروق المعنوية بإستخدام التحليل الإحصائي 20.0 برنامج حاسوب مثلاً (5*4*2) مضروب تصميم المتوسطات الطول عندالكتف ،محيطالصدر، محيطالبطن، طول الرقبة، وطول الوجه، طول الذيل ووزن الجسم تساوي (1.85±0.02متر، 02.±0.02 متر، 2.52±0.02 متر ،1.13±0.01 متر، 58.84±0.28سنتمتر، 68.60±0.42 سنتمتر و 512.30 ±7.84كجم) على التوالى. كما كشفت النتائج أيضاً أن قياسات الجسم تأثرت كثيربنوع الإبل والفئة العمرية للابل. الكناني أظهرالقيمة الأعلى في كل الدراسة متبوعاً بإنواع السلالات الأخرى.

فيما يتعلق بالفئات العمرية فإن الإبل في الفئة العمرية الرابعة (8-9) سنوات أظهرت قيم عالية بشكل ملحوظ في جميع قياسات الجسم يليها الفئة العمرية الثالثة (10-12) سنة، حيث أن الحيوانات في المجموعة الأولى (العمر≥4 سنوات) سجلت أقل القياسات أوالقيم . الى حد ما أظهرت النتائج أن الجنس يؤثر بشكل كبيرعلى محيط الصدر، طول الوجه ووزن الجسم وكان للذكورقيم قياسات أعلى بكثيرمن الإناث ($p<0.05$) . كماأستخدمت مجموعة إستبيانات منظمة ومفصلة لجمع المعلومات لعدد 60 من أصحاب الابل من مواقع مختلفة من منطقة البطانة في مقابلة أجريت خلال زيارة لكل مالك للإبل . الاستبيان صمم للحصول على معلومات عامة عن الأسروعلاقتها مع الإبل،نمط حياة أصحاب الإبل،الغرض من حفظ وتربية الأبل والعمليات الوراثية، إنتاج الحليب وممارسات الحليب، التغذية والسقاية ومعوقات إنتاج الإبل والخدمات البيطرية .أظهر هذا الجزء

من الدراسة أن أغلب أصحاب الإبل أميون يمارسون تربيةالإبل والزراعة معا ويملكون خبرة أكثرمن عشرين عام في تربية الإبل كحرفة وأيضاً تربى الإبل كمظهرإجتماعي . أظهرت الدراسة أيضاً أن أصحاب الإبل يختارون حيواناتهم وفقاً لتاريخ التربية متبوعاً بالإنتاجية ووالشكل الخارجي علاوة على ذلك فإنهم يركزون على أهداف تحسين الحليب واللحوم، الغالبية منهم أبقت الذكورمن نفس القطيع ويفضلون أنواع العربي الرشايدي والعنافي. أكثرمن 50% من أصحاب الإبل يختارون الذكورفي عمر 6 سنوات ويحتفظون بها حتى 15 سنة. أظهرت النتائج أن أغلب النياق تنتج حوالي 2-3 كجم من الحليب في اليوم خلال فترةالإدرارلمدة عشرة شهور . أغلب أصحاب الأبل يستخدمون المواليد لإدراراللبن . ووأن الابل تُحلب مرتين في اليوم، وأيضاًالأغلبية تسهلك اللبن المنتج وأنهم يستخدمونه الا القليل منهم يبيعونه.

أظهرت الدراسة أن المصدرالأساسي لتغذيةالإبل هوالمراعي (حيث تفضل الأبل الأشجارو الأعشاب.) وأن المصدر الأساسي للماء هو النهر، الآبار والحفائر، كما إتضح أن أصحاب الا بل يسقونها كل ثلاثة أيام في الصيف وكل ستة أيام في الشتاء، والمعوق الأساسي لإنتاج الابل هوالأمراض يليها نقص الأعلاف والمياه.

وقد اوصت الدراسة بمزيد من الاهتمام بالابل ومزيدا من الدراسات في هذا المجال .

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