

Acknowledgements

I am deeply indebted to my supervisor Professor Omer Abdel Rahim Elkhidir for his keen interest, patient assistance, invaluable advice and guidance during the course of this study.

Many thanks is due to Dr. Abdel Rahman Magzoub the head department of large Ruminant Research unit (KUKU) for providing the experimental animals.

My thanks and gratitude is also extended to the staff, workers and technicians of the live stock fattening Research department and the staff of the slaughter house in particular.

I am thankful to my colleagues Ezadeen, Mourtada, Khansa and Tarig for their invaluable assistance.

Appreciation is due to my sister Tagreed for typing this thesis.

I am always indebted to "ALLA" who granted me every thing, including the mind the health and the patience, which allowed me to accomplish this work successfully

list of contents

	Acknowledgements	I
	Table of contents	Ii
	List of tables	V
	List of figures	Vi
	List of appendices	Vii
	Abstract	viii
	Arabic abstract	Ix
1	Chapter one: Introduction	1
2	Chapter two: Literature Review	5
2.1	Types of cattle in Sudan.....	5
2.1.1	Northern cattle	5
2.1.1.1	Western Baggara cattle	5
2.1.1.2	Kenana cattle	6
2.1.1.3	Butana cattle	6
2.1.2	Southern Sudan cattle	6
2.1.3	Nuba mountains cattle	7
2.2	Growth and development	7
2.2.1	Definition of growth	7
2.2.2	Pre - natal growth	8
2.2.3	Growth of bone	9
2.2.4	Muscles growth	9
2.2.5	Deposition of fat	11
2.2.6	Measurement of growth	11
2.2.6.1	Live weight	11
2.2.6.2	Live weight dimensions	12
2.2.6.3	Growth curve	12
2.2.7	Compensatory growth	13
2.3	Non-carcass components	13
2.3.1	Factors affecting non-carcass components	14
2.3.1.1	Effect of nutrition	14
2.3.1.2	Effect of age	15
2.3.1.3	Effect of breed	15
2.3.1.4	Effect of slaughter weight	15
2.4	Dressing Percentage (D.P)	15
2.4.1	Factors affecting dressing percentage	16
2.4.1.1	Effect of nutrition	16
2.4.1.2	Effect of live weight	17
2.4.1.3	Effect of breed	17
2.4.1.4	Effect of age	18
2.5	Carcass composition	18

2.5.1	Hot carcass weight	18
2.6	Shrinkage	19
2.7	Live animal Measurement	19
2.8	Correlation Coefficients	21
3	Chapter three: Materials and methods	24
3.1	Experimental animals	24
3.2	Housing	24
3.3	Feed and feeding	24
3.4	Live animal data	28
3.4.1	Live animal measurements	28
3.4.2	Live weight	29
3.5	Slaughter procedure and slaughter data	29
3.6	Statistical analysis	30
4	Chapter four: results	31
4.1	Live animal measurements	31
4.2	Correlation coefficients	31
4.3	Regression analysis	35
4.3.1	Live animal weight	35
4.3.2	Hot carcass weight	43
4.3.3	Multiple regression	47
4.4	Carcass yield and characteristics	47
4.5	Non-carcass components	50
5	Chapter five: Discussion.....	53
	Conclusion	58
	References	59
	Appendices	71

List of Tables

Table		Page
1 Estimates of Animal population in (000)head	4
2Ingredient composition of the diet	26
3Chemical composition of the diet	27
4	The effect of slaughter weight (kg) on mean value of some body measurements (cm) of western Sudan Baggara	32
5bulls Correlation coefficients between live weight and variousbody measurements in western Sudan Baggara bulls	33
6	Correlation coefficients between hot carcass weight and some body measurements of western Sudan Baggarabulls	34
7	Regression of live weight in kg (y) on external body measurement (x) in western Sudan Baggarabulls	37
8	Regression of hot carcass weight in kg (y) on externalbody measurement(x) in western Sudan Baggara bulls	38
9	Carcass yield and characteristics of western SudanBaggara bulls	48
10	Effect of slaughter weight on mean values of non- carcass components in western Sudan Baggara bulls (percent of(empty body weight	51

LIST OF APPENDICES

Appendix No (1, 2 and 3)	Page
1. Proportion of Non- carcass components of western Sudan Baggara bulls at different slaughter weight Groups(% E.B.W)	71

Abstract

The study was conducted to examine the relationships between live weight, hot carcass weight and external body measurements in order to predict the live and hot carcass weight of cattle by using estimate equations and also to examine the effect of slaughter weight on some other slaughter traits.

A total of 101 Western Sudan Baggara bulls were grouped according to their slaughter weights into four groups: group A ranging from (200 to 250 kg), B (251 to 300 kg), C (301 to 350) and D (351 to 400 kg). of 15,30,33 and 23 animals, respectively.

The following data were taken: Live animal weight, empty body weight, and carcass weight, dressing percentage, non-carcass components and a set of 10 external body measurements. The carcass was chilled to determine the degree of carcass shrinkage.

The results indicated that empty body weight, carcass weight increased significantly ($P>0.001$) with the increase in slaughter weight. Chiller shrinkage decrease significantly ($P>0.001$) with increase in slaughter weight.

The increase in slaughter weight produced a significant increase ($P>0.001$) in the percentage of omental fat. The percentage of head, hide, heart, spleen, kidneys and four feet decreased significantly with the increase in slaughter weight.

It was observed that all the body measurements under study increased as slaughter weight increased. The results indicated that a high positive correlation coefficient was obtained between live weight and heart girth ($r = 0.87$, $P>0.001$) and medium correlation coefficient obtained between live weight and chest depth ($r = 0.77$, $P>0.001$).

The regression of live weight on heart girth indicated that a linear relationship existed. The regression equation for estimation of the live weight of Baggara cattle were as follows:

$$y = 4.8805x - 432.27$$

where y = live weight (kg)

x = heart girth (cm)

The study revealed that heart girth had the highest correlation coefficient with hot carcass weight ($r = 0.90$, $P > 0.001$).

The regression analysis gave an estimate equation for carcass weight as follows:

$$Y = 2.9635X - 293.36$$

where (Y) was hot carcass weight (kg)

(x) was heart girth (cm)

The above equations are recommended to estimate the live weight and hot carcass weight with a good accuracy.

ملخص الأطروحة

أجريت هذه الدراسة لمعرفة العلاقة بين الوزن الحي والوزن الحار للذبيحة ومقاسات الجسم المختلفة وذلك للوصول إلى معادلة لتقدير هذه الأوزان من قياسات الجسم الخارجية للأبقار.

أيضاً معرفة العلاقة بين وزن الحيوان عند الذبح وبعض صفات الذبيحة.

شمل البحث (101) عجل من أبقار البقارة (غرب السودان)، وزعت إلى أربع مجموعات وزنية، المجموعة (أ) تتراوح أوزانها عند الذبح من 200 إلى 250 كجم، المجموعة (ب) من 251 إلى 300 كجم، المجموعة (ج) من 301 إلى 350 كجم والمجموعة (د) من 351 إلى 400 كجم ضمت كل مجموعة 15، 30، 33 و 23 حيوان على التوالي.

تم أخذ المعلومات التالية: وزن الحيوان الحي، وزن الحيوان الفارغ، وزن الذبيحة، نسبة التصافي، وزن الأجزاء الداخلية والخارجية للحيوان كما تم أخذ مجموعة عشرة قياسات خارجية على الحيوان الحي.

أوضحت النتائج أن زيادة وزن الحيوان عند الذبح تؤدي إلى زيادة معنوية في وزن الذبيح الحار والبارد ووزن الحيوان الفارغ، كما تؤدي إلى نقصان درجة انكماش الذبيحة. كذلك وجد أن بزيادة وزن الذبح تتناقص نسب الرأس، الجلد، الأرجل، الطحال والكليتين من وزن الجسم المفرغ بفروق معنوية.

أوضحت النتائج وجود معامل ارتباط عالي ومعنوي بين الوزن الحي ومحيط الصدر ($r = 0.87$) ووجود ارتباط متوسط بين الوزن الحي وعمق الصدر ($r = 0.77$).

أظهر تحليل الانحدار وجود علاقة خطية بين الوزن الحي ومحيط الصدر ومن ثم أمكن استنباط معادلة لتقدير الوزن الحي.

$$y = 4.8805x - 432.27$$

حيث أن: y = الوزن الحي للأبقار (كجم).

x = محيط الصدر (سم).

كذلك أظهرت الدراسة أن محيط الصدر ذو معامل ارتباط عالي ومعنوي مع الوزن الحار للذبيحة ($p < 0.001$ 0.90)، ومن تحليل الانحدار استنبطت معادلة لتقدير الوزن الحار لذبائح الأبقار

$$Y = 2.9635X - 293.36$$

حيث أن: Y = الوزن الحار للذبيحة (كجم).

X = محيط الصدر (سم).