SOME STUDIES ON GROWTH PATTERNS IN BUFFALO AND FRIESIAN CROSS-BRED BULLS FOR MEAT PRODUCTION

A Thesis

BY

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B. Sc. Agric., Ain Shams University (1972)

Submitted to the Department of

Animal Production, Ain Shams University

In Partial Fulfillement of the Requierements for the Degree

of

MASTER OF SCIENCE

(Animal Breeding)

July 1977

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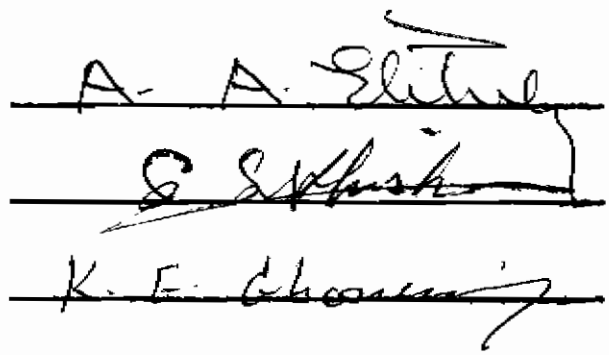
Approved as to style and content by:



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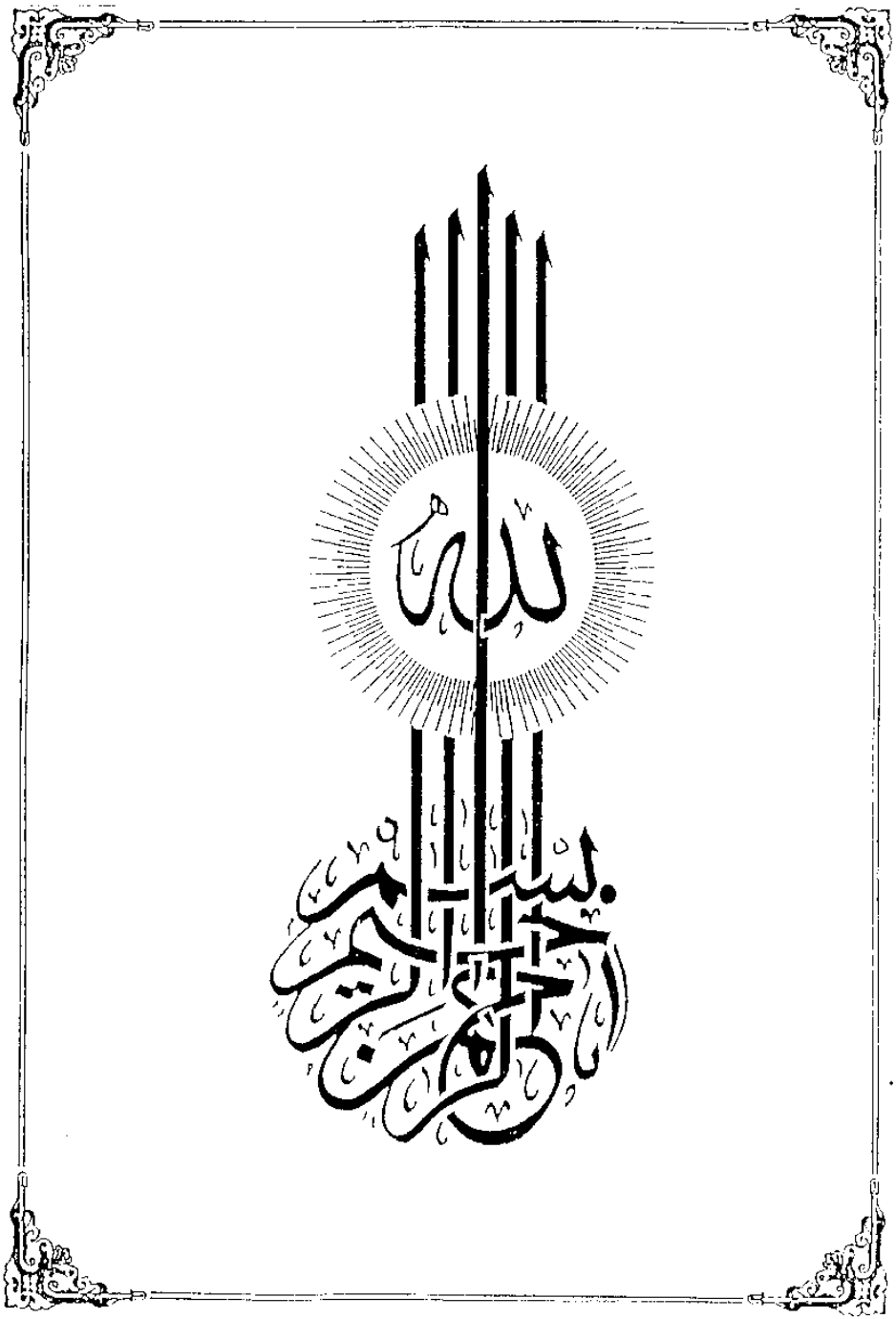

ACKNOWLEDGEMENTS

The writer is grateful to Professor S.S. Khishin for his valuable suggestions and continuous encouragement and support. The author is also greatly indebted to Dr. Omar Y. Abdallah Associate Professor, for suggestion the problem and for his great help while supervising this study.

Thanks are also due to Professor A.A. Asker, Head of the Department of Animal Production, for providing facilities during the collection and analysis of data included in this study.

The author finally wishes to acknowledge with gratitude the help and support rendered to him by his colleagues of the Department of Animal Production, Faculty of Agriculture, Ain Shams University.

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INTRODUCTION

The composition of an animal changes as it grows older and increases in size. The changes in composition of animals that occur during normal body weight growth have to be taken into account when assessing differences in body composition between genotypes and experimental treatments. The direct assessement in terms of body composition, of changes that occur during development may be made on animals of different sizes at a prearranged sequence of times (cross-sectional study).

Tracing genetic differences in carcass composition, by means of cross-sectional data has been the subject of extensive studies abroad. Yet, buffaloes in this respect is almost completely overlooked, and comparative anatomical growth studies of bufflaloes and cattle has the author's knowledge never been conducted. This may seem unjustifiable, as buffaloes present, in many areas, a genotype particularly suited to provide meat for lean-markets. With view of offering a contribution towards filling that gap, the present study mainly seeks to elucidate genotype influence on the weight of major carcass tissues during developmental growth using cross-sectional data of buffalo and Friesian cross bulls.

C H A P T E R II

REVIEW OF LETERATURE

Berg & Butterfield (1966) provided the most practical criteria of carcass merit by stressing that it is a combination of composition, conformation and eating quality. Later, Berg & Butterfield (1967) argued the importance of the weight distribution of carcass components in evaluation the potential merit of beef animals, inasmuch as it influences carcass conformation.

1. Changes in Weights of Separable Carcass Components Associated with Changes in Size

Extensive studies have consistently shown that changes in carcass composition are associated with changes in size and age (e.g. Hammond, 1932; Pàlsson, 1955; Tayler, 1964; Berg & Butterfield, 1967; Seebeck & Tulloh, 1967, 1968 a, b). The result, according to Seebeck (1968), is to take into consideration the changes in composition of animals that occur during normal body growth weight when genetic differences in carcass composition have to be traced. This can be achieved by a serial slaughter of random samples of animals over a range of live weight or at a pre-arranged sequence of time

followed by a separation of tissues. With the cross-sectional data so collected, statistical techniques are readily available, and the mean trend of development for genetic groups can be compared. As development is basically related to size of the animal rather than to the age, Boccard et al (1962); Tulloh (1963b) and Seebeck (1966) stressed on comparing animals at similar weight rather than similar age.

1.1. Choice of Appropriate Covariate

With developmental studies using a range of sizes and using conventional least-squares techniques, an independent variate, usually a criterion of growth, is needed. Against this variate (covariate), changes in carcass composition can be assessed. The within-group variation of the components will be at a minimum if they are compared at the same value of an appropriate covariate. To study the major components of the carcass, the weight of the dressed carcass, or of one side of it, has been investigated by several authors as reviewed by Seebeck (1968). An alternative approach is the use of fat-free or fat-corrected carcass weight (Wilson, 1954; Everitt, 1966) or muscle plus bone weight (Elsley et al 1964; Berg &

Butterfield, 1966; Mukhoty & Berg 1971, 1973). The exclusion of the fat tissue from being part of growth has been defended on the grounds that it is controled more by nutrition than other components of the body (Maynard 1947; Elsley et al 1964). However, Pomeroy (1955) defended the inclusion of fat tissue as part of growth on the grounds that at least some of the fat has specific insulating properties. Seebeck (1968) provided a statistical answer to this dilemma by stressing that the test of correlation between developmental criteria put forward by Seebeck & Tulloh (1966) should be done before fat-free carcass weight is used as a covariate. Seebeck (1968), examining three sets of data for correlations of developmental criterion, concluded that "a correlation between development in terms of fat and development in terms of other components" may exist.

1.2. Genotype Differences in the Mean Trend of Development

Very few investigations have been carried out to study changes in carcass composition that occur during normal body weight growth when assessing breed differences in the weight of separable carcass components. Berg & Butterfield (1966)