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A STUDY ON OPTIMUM EWE SIZE UNDER DESERT CONDITIONS

BY

NAYERA ZAKY BEDIER

A THESIS

*Submitted to the
Faculty of Agriculture
in Partial Fulfilment of
The Requirements for the Degree of*

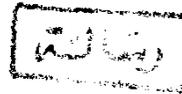
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in

ANIMAL BREEDING



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TO MY PARENTS

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INTRODUCTION

In the North Western Coastal Desert of Egypt, Barki sheep are considered the predominant breed in the area and constitute about one third of the sheep population in Egypt. Keeping sheep represents a main part of the income of the inhabitants of that zone.

Barki breed is well adapted to the harsh prevailing conditions including poor feeding, heat stress and disease and its production is rather low. Barki sheep are characterized by long limbs, small body weight and open fleece to fit in the desert environment, i.e. vast areas with sparse vegetation and long hot dry summers. Size of sheep has a direct relationship with feeding requirements on one side and productivity on the other. There is a reasonable amount of information of the relationship of feeding requirements and sheep size. Maintenance requirement of an animal is proportional to metabolic body weight and represents almost 80% of its total requirements (Owen, 1981). In order to reduce maintenance requirements and consequently feed costs, it is desired to keep flocks with small ewe size which mate to ram characterized by high growth rate. Though, productivity may increase with ewe size full information on the relationship between ewe size and productivity seems to

be lacking in local breeds. Thus, the main objective of the present study is to throw some light on the relationship between ewe size and productivity in sheep and to estimate genetic parameters for different productive traits to help in planning breeding programmes.

This thesis includes two main items, firstly an experimental work to define more clearly ewe size, secondly study of ewe size in relation to its productivity.

ABBREVIATIONS

B	=	Barki
M	=	Merino
A	=	Awassi
AB	=	$\frac{1}{2}$ Awassi $\frac{1}{2}$ Barki
MB	=	$\frac{1}{2}$ Merino $\frac{1}{2}$ Barki
$\frac{3}{4}$ M $\frac{1}{4}$ B	=	$\frac{3}{4}$ Merino $\frac{1}{4}$ Barki
NC	=	Number of services per conception
ECEJ	=	Number of ewes conceived per ewe joined
LBEJ	=	Number of lambs born per ewe joined
LWEJ	=	Number of lambs weaned per ewe joined
KG1J	=	Number of kilogrammes produced at one month per ewe joined
KG2J	=	Number of kilogrammes produced at two months per ewe joined
KGWJ	=	Number of kilogrammes weaned per ewe joined
TLB	=	Total number of lambs born
TLW	=	Total number of lambs weaned
TKB	=	Total number of kilogrammes born
TKW	=	Total number of kilogrammes weaned

REVIEW OF LITERATURE

1. Body Weight and Measurements as Indicators for Ewe Size

Differences in size exist within and between species and breeds, and optimum size has always been a target of animals breeders. This is because size of the animal has a bearing on biological efficiency and productivity, being the main determinant of the amount of feed required for maintenance, rate of growth, amount of product per animal and amount of product per kg of animal weight.

The subject of the optimum size of farm animals, both within and between breeds, which leads to maximum or optimum productivity has been considered by many workers. Robertson (1973) discussed body size as related to efficiency while Holmes (1973) looked at the size of the animal in relation to its nutritional requirements. Baker et al. (1973) showed the economic points related to size of animal and Taylor (1973) discussed genetic aspects of size.

Dickerson (1978) considered the effect of body size on the life cycle or integrated production efficiency of the entire animal population for both non-ruminants and ruminants.

In the literature, the term "size" is not well defined, therefore it can be such an ambiguous word and may refer to height, weight, skeletal size and metabolic body weight. Most frequently the subject is discussed in terms of body weight or some function of it representing metabolic body size (Bowman, 1973).

More recently, Gebrelul (1985) estimated body size in 208 Targhee, Finnish Landrace (FL) x Targhee and Suffolk x Targhee ewes by multiplying the average of hip and chest widths by body length and chest depth.

From a mathematical point of view, size of the animal should be expressed by its volume. However, it looks that size of the animal as represented by its volume has never been tried in the literature.

2. Ewe Size in Relation to Inputs

2.1. Feed input

There is a strong relationship between size of animal and feed input. For any farm animal, efficiency of feed conversion depends on maintenance requirements which constitute over 50% of energy intake for adult sheep. Thus, increasing output per unit of maintenance would result in improving animal efficiency (Dickerson, 1978). The maintenance requirement of an animal is related to

to metabolic body size. It is now generally accepted that the power of body weight which gives the best single estimate for mature ruminants is 0.75 (Kleiber, 1965, after Baker et al, 1973 and Dickerson, 1978). Consequently, heavier animals generally require greater amounts for maintenance.

Baker et al (1973) showed that the amount of feed required for maintenance is one of the main factors linked to size in affecting profitability. This has been confirmed by Owen (1981) who noticed that the size of the sheep directly affects its intake. Intake itself affects directly the rate of gain and the efficiency of conversion of feed into gain.

Thomson and Parks (1983) working in groups of fine woolled and strong-wooled Merino rams and Dorset Horn rams and wethers, found that variation between breeds in the level of feed intake and feed conversion efficiency was largely a function of mature size.

2.2. Non-feed inputs

Size of animal may have a major impact on need for resources other than feed, particularly labour, housing and capital. These aspects deserve some consideration.

Holmes (1973) showed that larger animals needed less