STUDIES ON SALT TOLERANCE AND WATER DEPRIVATION IN SHEEP

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THESIS

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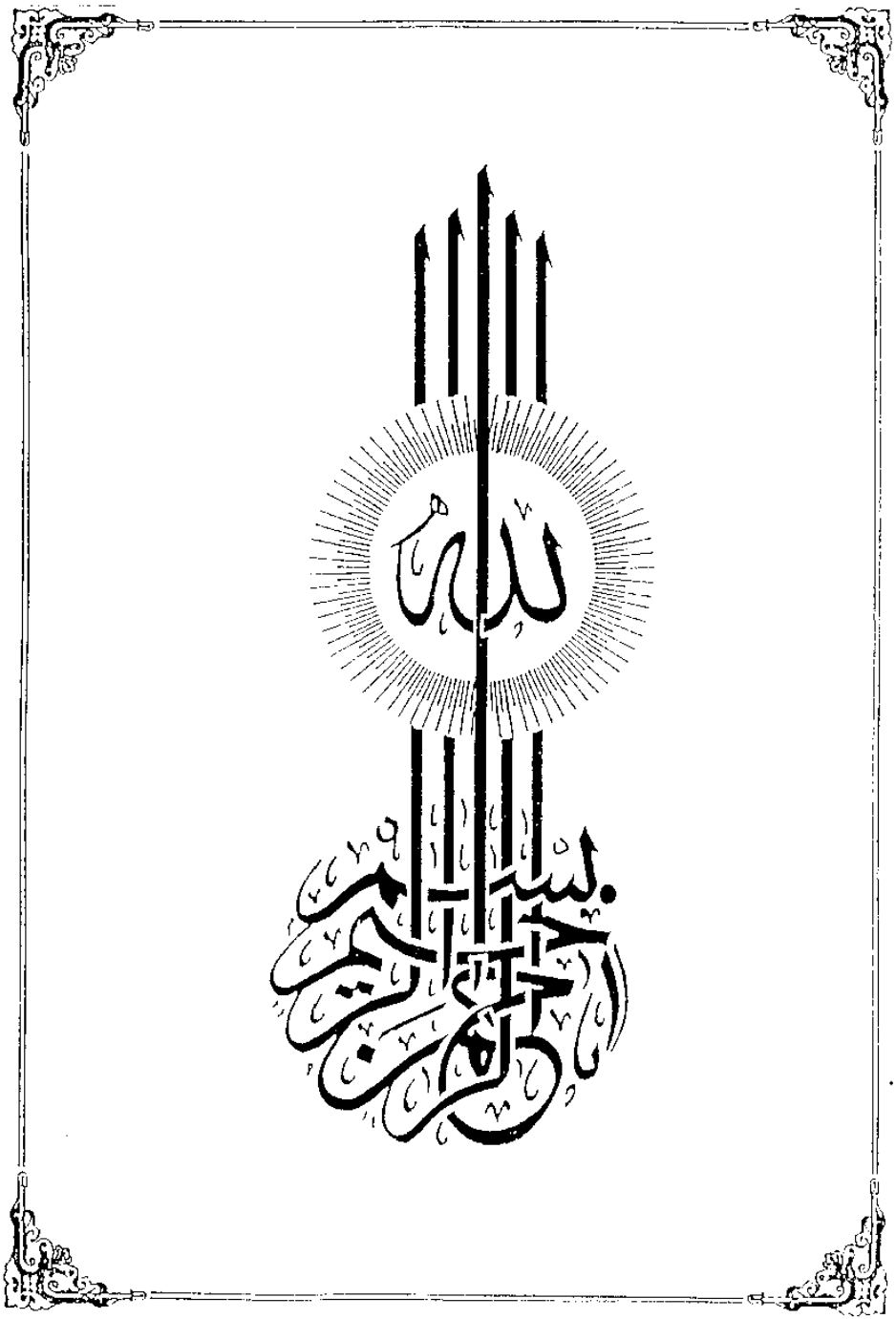
بسم الله الرحمن الرحيم

سبحانك لا علم لنا إلا ما علمتنا
إنك أنت العليم الحكيم

صدق الله العظيم
(سورة البقرة ، آية ٣١)



Courses studied by the Candidate in Partial Fulfilment of the Requirements for the Degree of Master of Science

* Language : French, M.Sc. Course

* Zoology Courses:

1- Physiology of vertebrate

2- Histochemistry

3- Cytochemistry

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DEDICATION

TO MY LOVELY PARENTS AND
MY DEAR HUSBAND

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INTRODUCTION

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The present work is carried out in aim to find out the proper possible conditions under which one can raise farm animals ir scarced fresh water areas. Merino X Barki cross rams are selected in these studies and subjected to two different conditions of fresh water deprivation. In the first condition the rams are allowed to drink saline water (1.3 % NaCl) during the whole summer and winter seasons. In the second condition the rams are deprived from any water (fresh or saline) for 4 consecutive days monthly during the summer season. Certain body characteristics of physiological importance are studied under the above mentioned conditions and to correlate the probable changes with the above mentioned conditions.

These body characterestics are: Body weight changes, rectal temperature, water intake, food intake, amount of urine excreted; amount of K, Na, Ca, Mg excreted in urine; concentration of K, Na, total Ca, Mg and cholesterol (total and free) in plasma; cholesterol content (total and free) in tissues: skin, lung and kidney (cortex and medulla). Atmospheric temperature and relative humidity were taken into consideration.

LITERATURE

LITERATURE

According to Ellis and Gardner (1912) the cholesterol content of the Kidney is uninfluenced by diet.

Bloor (1915, 1916), reported that the mean values 174 mg. (130-240, five dogs), 230 mg. (180-300, seven dogs), and 220 mg. (150 370 seven-dogs), for chole sterol in blood of dogs, calculated as mg./100cc. of the blood.

Terrione (1920) recorded an average cholesterol value in plasma of 122 mg. / 100 cc (90-150 , for seven dogs).

Seddon (1926) did not observe any increase in sodium or chloride in plasma of sheep which were drinking water containing 1.7% NaCl.

Roffo (1928) reported that the cholesterol content of the skin from an exposed area such as the face was greater than of that obtained from an area normally covered such as the abdomen.

Gambile et al. (1929) pointed out that the effect of electrolyts in rats is additive and the urine contained 500-600 m-eq./L. of Na and K.

Roffo (1932) reported that the cholesterol in the facial skin of the infant was shown to increase with age, as a result of the effect of light.

Heller (1933) reported an increasing in sodium concentration in sheep, cattle and dogs sera under high salt intakes in feed or drinking water.

Ladd and Raisz (1949) found a rapid excretion of salt in dogs after the oral administration of sodium chloride in amounts of 4 g./kg./day.

Baldwin et al.(1950) reported that reabsorption in the kidney tubules of dogs may be diminished after intravenous saline infusion.

Gold and Taylor (1950) and sere et al.(1950) making use of C^{14} acetate demonstrated that the skin possesses the ability to synthesize cholesterol at a rate comparable with that of the liver.

Elliot et al.(1953) found that daily NaCl supplementation to lambs in amount of 20 gm./head hydrates extracellular fluids to an increase of 3% of body weight as compared with unsupplemented lambs. The superior gains of salt supplemented lambs appear to be due to retention of water as a result

of hydration. The sheep has a particular facility for conserving body sodium.

Nelson et al. (1955) found in steers and wethers fed normal and high-salt ratios that a slight but non significant increase in retention of sodium and chlorid in both steers and wethers.

Macfarlane (1956) found that Merino sheep in hot environments effectively reduced the rate of excretion of water but that of Na and K may not change and often increased during period of dehydration.

Mali (1956) recorded that cholesterol in the barrier zone together with the tight Keratin structure inhibits the diffusion of the water through the skin membrane.

Peirce (1957) studied the effect of different concentrations of NaCl in drinking water. The concentrations were (0.0, 1.0, 1.5, and 2.0 % NaCl). He reported that the intake of drinking water increased with concentration of NaCl. It also increased in all groups which were higher in the hottest mounths than in coldest months. He also reported that there was a decline in food consumption and body weight of

the affected animals, and several receiving 2.0 % NaCl became very emaciated and weak and two were killed in extremis. He also pointed that NaCl in drinking water had no effect on the concentrations of Na, K, Ca, or Mg in blood plasma.

In (1958) Levinsky et al. studied the effect of reduced glomerular filtration on urine concentration in the presence of ADH. The authors concluded that when the glomerular filtration rate (GFR) of the kidney was lowered from 10 to 25% in dehydrated dogs infused with vasopressin , the concentration of the urine from the kidney regularly increased up to 40% greater than of the controls. Under this circumstances, analysis of the tissue showed that urea concentration always and sodium chloride concentration usually were reduced in the mudulla of the kidney whose GFR had been lowered.

Steiter (1959) gave various volums (2.5 to 4.5ml/ mouse) of distilled water or NaCl solutions (0.3 to 1.8%) orally to mice to study the influence of the volumes of the fluid and of salt concentration on the rate of diuresis and on the urinary excretion of Na,K