# EFFECT OF VITAMIN A DEFICIENCY IN RATIONS ON REPRODUCTIVE PERFORMANCE OF RAMS

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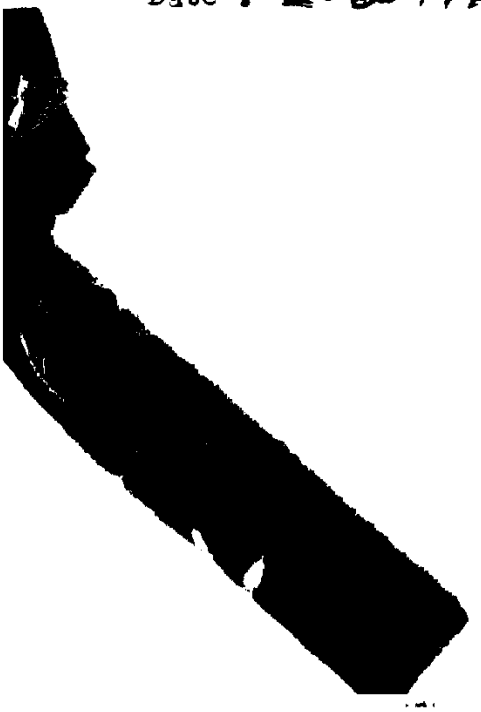

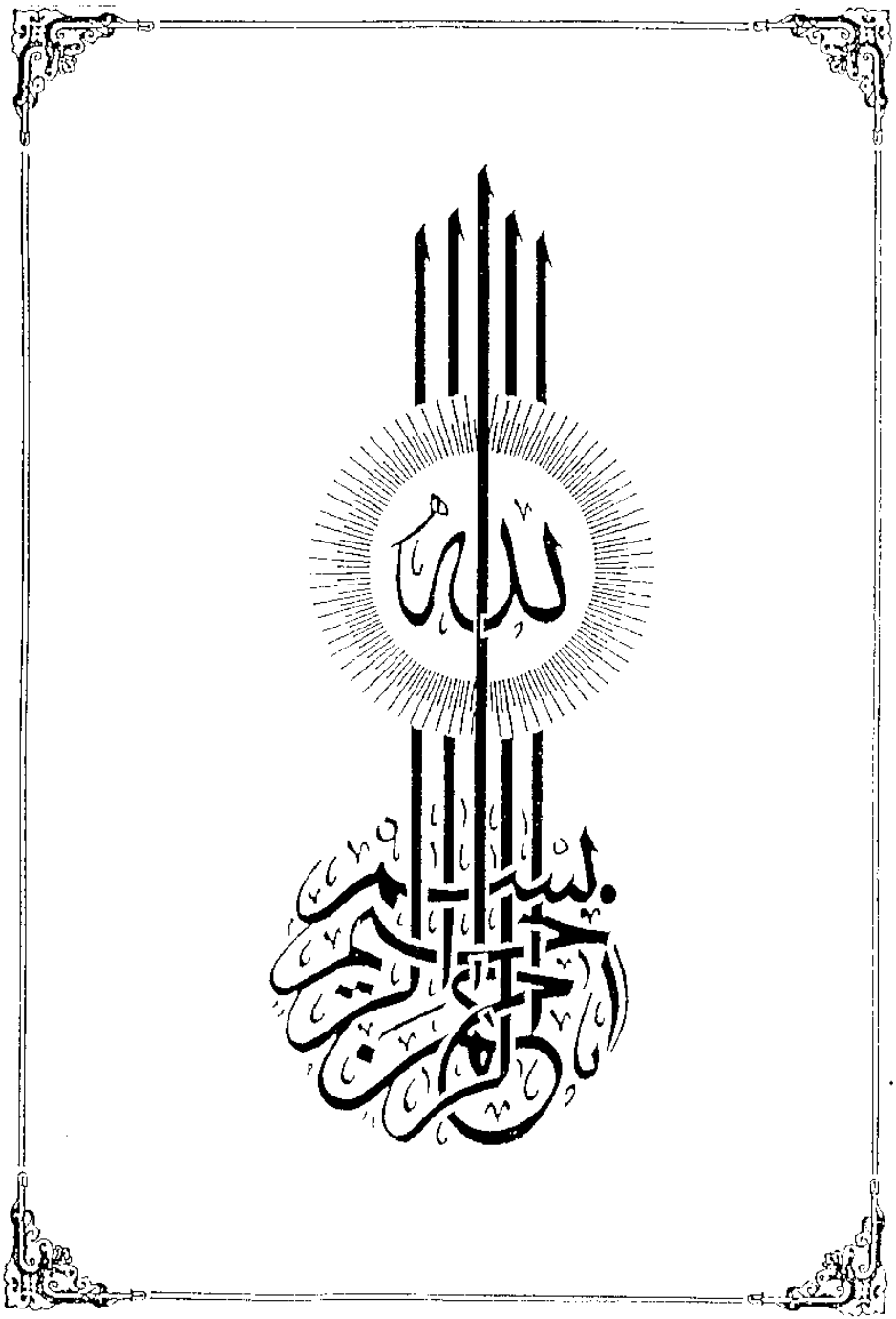

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# INTRODUCTION

Avitaminosis A exerts an adverse effect on reproduc in both males and females of domestic species, and it seems likely that both cattle and sheep in the semiarid pastoral countries may suffer from a low carotene intake under normal seasonal conditions.

Even today, in spite of our more extensive knowledge of vitamin A, we are confronted with the problem of not only recognizing the need, but also providing an adequate intake of this vitamin for our live-stock.

Vitamin A is required for the normal functioning of epithelial tissues, especially mucous membranes of the respiratory, digestive, reproductive and urinary tracts, also it is necessary for vision, the normal development of bones in growing animals especially the cerebro-spinal tract and for growth.

Egyptian live-stock receive in summer feeding a low quality roughage -straws- plus some concentrates which will usually not supply sufficient vitamin A activity to meet the animal needs.

In addition in summer the excessive temperatures apparently increases vitamin A requirements.

In the western coastal desert in Egypt there is about half a million sheep. During most part of the year, sheep are fed on dried vegetations and concentrates plus hay, straw and grazing for a short period of the year. The grazing season depends upon the amount of rainfull which varies greatly from one year to another.

Thus, this feeding system is considered to be deficient in provitamin A, the carotene.

Field observations have indicated symptoms of vitamin A deficiency and low fertility stimulated the interest of some studies. Ghanem (1963 and 1967), Shaaban (1970) and Soboud(1972) studied some factors related to vitamin a deficiency in ewe fertility.

As far as the writer is aware, little information are available about the relation-ship between vitamin A and ram reproduction. This study was therefore conducted to determine the effect of vitamin A deficiency on some semen characteristics , and vitamin A supplementation to deficient rams.

## II. REVIEW OF LITERATURE.

### (1) Vitamin A and reproduction in the male:

It is suggested that vitamin A supplement may be beneficial in the breeding bull ration when animals are on dry - lot and receive hay which has been stored for several months, especially under hot environmental conditions (Roussel et al,1963).

In extensive studies with most of mammals, vitamin A deficiency resulted in a gradual loss of germinal cells in the semineferous tubules and cause testicular atrophy. Sutton et al (1940), showed that a degeneration of the germinal epithelium of the testes, absence of spermatozoa in the epididymis and changes in the pituitary gland, were associated with vitamin A - deficient diets in the bovine species. Thorp et al (1942), observed a degenerative changes in the testicle, these probably inhibited normal spermatogenesis in calves in the case of low vitamin A diets. Madson et al (1942) and Hodgson et al (1946), have reported that local damage to germinal tissues of the testis due to vitamin A deficiency is repairable.

Semineferous tubules undergone degeneration in dairy bulls at different ages by adjusting the vitamin A intake (Hodgson et al,1946) . Typical patterns of degeneration of the germinal epithelium of semineferous tubules were found in the bulls on the carotene deficient rations, there were few spermatogonia, spermatocytes, spermatides, or maturing spermatozoa in the lumen of the tubules (Bratton et al, 1948).

Erb et al (1947), reported that sexual maturity was delayed, libido inhibited and spermatogenesis was reduced, they also reported that, although moderate prepubertal vitamin A deficiency did not completely inhibit sperm production, fertility and reproductive capacity appeared to be seriously impaired since sexual drive and spermatogenesis were reduced, they also alluded to the possibility that prepubertal damage may be permanent especially when severe and widespread.

Madsen et al (1948), showed that histological evidence of testicular injury due to presumably to vitamin A deficiency, and that evident after as long as 20 months of low carotene feeding.

Lindley et al (1949), observed that average weight of testis of rams receiving vitamin A supplementation was 603.8 gms., while it was 239.5gms. in rams with no supplement, the difference occurred found to be significant, they noticed also that, degeneration of the germinal epithelium was apparent in all vitamin A deficient rams and in this case the diameter of the semineferous tubules appeared smaller than normal, in some cases it was only a few cell layers in height, and in others had sloughed away from the basement membrane, in addition they reported that neither testosterone nor pregnant mare serum injections were effective in maintaining testicular structure of vitamin A deficient rams.

Typical pattern was observed by Dutt (1959), who demonistratod that young rams born of dams kept on subadequate vitamin A diet which contained only traces of

vitamin A, after a month, symptoms of vitamin A deficiency began to appear, the testes were atrophied and the weight of the organs of normal rams were about 7-10 times the weight of those of vitamin A deficient rams, he found also that deficient rams showed little of sexual desire and libido was declined till after ten months of feeding on carotene deficient diet, then little or no sexual interest could be aroused, the same author alluded also that semineferous tubules were degenerated, most of them reduced in diameter and lined by a single layer of cells and there was no sign of spermatogenesis.

Ghannem et al (1966), observed that vitamin A deficiency in young bulls caused reduction in testicular weight, great effect in spermatogenesis, had little effect on spermatogonial cells, Leydig cells were greatly affected resulted in hyperplasia followed by degeneration, and pronounced changes in the seminal vesicles. In other investigation with young bulls Ghannam et al (1969), reported that, the most pronounced effect of vitamin A deficiency was in the corpus and cauda epididymis the lining cells and lumen diameter were greatly affected,

they noticed also that feeding a ration deficient in vitamin A or carotene produced a gross reduction in the diameter of vasa deferentia.

Vitamin A deficiency in the rats and probably in many other species results in three major abnormalities in the male reproductive system; metaplasia of epithelia and infection, atrophy of the accessory sexual organs, and degeneration of germinal epithelium of the testes (Thompson, 1969), he reported also that the accessory sexual organs in deficient animals, such as the seminal vesicles, are sometimes smaller than normal and the testes become edematous, and the germinal epithelium is lost.

(2) Vitamin A and live weight changes:

Vitamin A is essential for growth and wellbeing of young animals (Hannux & Antoine, 1956). Adams and Bauernfeind (1963), reported that vitamin A deficiency caused reduced appetite, impaired growth also showed poor feed efficiency and diarrhea.

Lindley et al (1949), demonestrated that average daily gain for the entire period differ significantly ($P. < 0.01$) between lots of rams receiving the basal rations and lots which received basal rations plus vitamin A supplementation, although the differences in the rate of gain did not become apparent until the experiment had been in progress for several months.

Cline et al (1963), showed that vitamin A, alpha - - tocopherol and potassium nitrate did not affect the rate of gain in fattening lambs. Ricketts et al (1965), found that prepartum supplementation for brood ewes with approx. 633 IU. of vitamin A per pound of body weight did not have a significant effect on lamb gains, they demonstrated also that newborn lambs given 25,000 I U. of vitamin A, or 225 mg. of injectable iron dextran at birth and again at 10 days or the combination of these two did not affect daily gains significantly of lambs from birth till weaning. Bell et al (1965), reported that lambs from ewes given vitamin A gained slightly more weight than lambs from untreated ewes.

Martin et al (1968), showed that average daily gain for lambs fed depleted ration of vitamin A was 0.17 kg. during depletion and it was about 0.10-0.12 kg. during repletion with diet contained maize, silage to appetite and soya bean meal with minerals and vitamins or modified depletion diet with 0.52,1.55 or 4.65 mg. stabilized retinyl palmitate per kg. diet.

Sooud (1972), found that, body weight of the control group maintained on free vitamin A ration persists constant up to a variable time before death (2-5 days) at which it declined rapidly as a result of loss of appetite with an obvious drop of blood plasma vitamin A level. The latest author demonstrated also that, vitamin A supplementation at two different levels (medium, with 50,000 i.u. vitamin A per head monthly,and high with 100,000 i.u. vitamin A per head monthly) for ewes was of no effect on birth weight or weaning weight of the newborn lambs, though, male lambs of the medium group were significantly heavier at weaning as compared to male lambs of the high treated ewes.