

**EFFECT OF PLANE OF NUTRITION ON THE DEVELOPMENT
OF CARCASS AND VISCERAL ORGANS OF LAMBS**

By

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SUMMARY

This study comprised twelve Ossimi lambs, randomly chosen out of a creep feeding trial which were divided into two groups *i.e.* creep-fed and control. Creep feeding started at the age of 3-4 weeks till weaning. Thereafter, a relatively high plane of nutrition continued for the creep-fed lambs till the age of 10 months. At the age of 1, 2, 3, 4, 6 and 9 months one lamb of each group was slaughtered. The various parts of the body and internal organs were weighted. The following results were obtained :

(1) The carcass weights and percentages of the creep-fed lambs were higher than those of the non-creep-fed ones. The weights of the head, skin and feet relative to live-weights were heavier in the non-creep-fed group than in the creep fed.

(2) The spleen, kidneys, liver and heart were heavier in the creep-fed lambs than in the non-creep-fed. The weights of the spleen, liver, kidneys and heart relative to live-weights showed a decreasing trend with advance in age.

INTRODUCTION

Several research work have been dedicated to study the numerous factors contributing to mutton and lamb production and reached the conclusion that the plane of nutrition is of prime importance in this respect Hammound (1932), Badreldin (1951), Palsson and Vêrges (1952), Dzaparidze (1964) and Tallis et al (1964).

Moreover, it has been found out that the response of sheep to high plane of nutrition largely depends on age Hammound (1932) Wallace (1948) and Wardrop (1960).

Considering that the value of lambs as meat producers depends on their carcass weights rather than live-weights, this experiment aimed at studying the effect of creep feeding the indigenous Ossimi lambs on the development of their carcass and visceral organs.

MATERIALS AND METHODS

This study was carried out on the farm of the Animal Production Department, Faculty of Agriculture, University of Cairo, and comprised twelve Ossimi male lambs born in October and November 1963. The animals used in this experiment were randomly chosen out of a creep feeding trial which comprised 64 Ossimi lambs. The Ossimi sheep as described by Mason (1951) belong to the carpet wool fat-tailed indigenous sheep of Egypt.

At birth, lambs were equally and randomly divided into two groups, one of which was creep-fed and the other was kept as a control. Creep feeding started at the age of 3-4 weeks till weaning at the age of four months. After weaning, creep-fed lambs were put under a relatively high plane of nutrition till the age of 10 months. On the other hand, the control lambs were put under the conventional system of feeding (table 1). The food mixture used for creep feeding consisted of 30% coarse ground barley, 40% craked corn, 15% wheat bran and 15% linseed cakes, also 2% mineral salts per total weight of the concentrate mixture was added to the ration.

TABLE 1.—DAILY SYSTEM OF FEEDING OF THE CREEP-FED AND CONTROL LAMBS

| Age (week) | Creep-fed lambs | | | | Control lambs | | | |
|------------|-----------------|-------------|--------------|-------------------|---------------|-------------|--------------|-------------------|
| | Conc. (g.) | Clover (g.) | Starch value | Digestive protein | Conc. (g.) | Clover (g.) | Starch value | Digestive protein |
| 3 | Training to eat | 100 | 49 | 7 | — | 100 | 10 | 2 |
| 4-5 | 50 | 100 | 49 | 7 | — | 100 | 10 | 2 |
| 6-7 | 100 | 200 | 98 | 15 | — | 200 | 20 | 4 |
| 8-9 | 150 | 300 | 147 | 22 | — | 300 | 30 | 6 |
| 10-11 | 250 | 500 | 245 | 36 | — | 500 | 50 | 10 |
| 12-13 | 350 | 750 | 347 | 52 | — | 750 | 75 | 15 |
| 14-18 | 450 | 900 | 440 | 65 | — | 900 | 90 | 18 |
| 19-25 | 550 | 900 | 518 | 75 | 250 | 900 | 277 | 40 |
| 26-30 | 750 | 900 | 596 | 85 | 300 | 900 | 314 | 44 |
| 31-35 | 750 | 900 | 674 | 96 | 370 | 900 | 366 | 51 |
| 36-40 | 800 | 1000 | 722 | 104 | 400 | 1000 | 400 | 55 |

During the suckling period which extended from birth till the age of four months, all lambs were freely allowed to suckle their dams during five hours each day.

At the ages of 1,2,3,4,6 and 9 months, two lambs, one from each group were weighed and slaughtered by severing the jugular vein in the neck. The head, skin, feet, alimentary tract, spleen, liver, heart and kidneys were weighed. Finally the warm weight of the carcass was recorded and the empty body weight was estimated by subtracting the total gut "fill" from the live-weight.

Since the creep-fed and control lambs were randomly chosen and that the treatment practically started at the age of one month, the average weights of the different parts of the alimentary tract of both creep-fed and control lambs at this age were taken as the basis for comparison with those of succeeding ages so as to make the data more illustrative.

RESULTS AND DISCUSSION

Creep-fed lambs showed heavier live-weights than lambs raised under the conventional system of feeding and the differences between the two groups increased with advance of age. Moreover, the creep-fed animals had heavier empty body weights and higher carcass percentages than the non-creep-fed lambs which indicate that creep feeding could augment the normal growth and development of sheep (Table 2, Fig. 1).

The head, skin and feet were heavier in the creep-fed group than in the non-creep-fed. However, when expressed as a percentage to live-weight, the reverse was found. This might be due to that the extrimites are among the early developing parts and therefore have got the priority for nutrients during the pre-natal live, and are relatively less sensitive to post-natal changes in the plane of nutrition. This result agrees with the findings of Hammond (1961).

The fat-tail was heavier in the creep-fed group. This indicates a greater tendency to fat formation in the tail most probably brought about through the deposition of the excess calorie intake as neutral fat in the various fat stores of the body.

At all studied ages, lambs put under high plane of nutrition had heavier spleens, livers and kidneys than control lambs (Table 3). This agrees with the conclusion drawn by Wallace (1948). The heavier weights of the kidneys of the creep-fed group than those of the control lambs could be considered as an indication to their higher functional activity in eliminating the waste products of the greater amounts of ingested food.

Although varying within narrow limits, the hearts of the creepfed animals seemed to follow a high developmental trend over those of the non-creep-fed which could be consequent to their heavier live weights.

Irrespective of the level of nutrition, the relative weights of spleen, kidneys, liver and heart to live weight decreased with advance of age (Table 4) which might be due to the fact that these organs being very vital are early maturing and reach their mature weights at an early age. These results agree with the conclusions drawn by Hammond (1932), Wallace (1948) and Wardrop (1960).

TABLE 2.—FRESH WEIGHTS (KGS) OF THE DIFFERENT PARTS AND ORGANS AND WEIGHTS EXPRESSED AS A PERCENTAGE TO THE CORRESPONDING WEIGHTS

| Treatment | Age (months) | Live Weight (kg.) | Empty body wt. | Empty body wt. % | Carcass wt. (kg.) | Carcass % | Head skin & feet wt. (kg.) | Head skin & feet % | Fat Tail |
|-------------|--------------|-------------------|----------------|------------------|-------------------|-----------|----------------------------|--------------------|----------|
| Creep-fed . | 1* | 9.825 | 7.854 | 79.94 | 5.159 | 52.51 | 1.858 | 18.91 | 0.153 |
| | 2 | 15.500 | 11.556 | 74.56 | 7.537 | 48.63 | 2.698 | 17.41 | 0.450 |
| | 3 | 18.500 | 14.300 | 77.30 | 9.163 | 49.53 | 3.394 | 18.36 | 0.406 |
| | 4 | 20.000 | 16.440 | 82.20 | 10.281 | 51.41 | 3.920 | 19.60 | 0.472 |
| | 6 | 26.000 | 20.415 | 78.52 | 12.834 | 49.36 | 4.994 | 19.21 | 0.650 |
| | 9 | 41.200 | 32.488 | 78.85 | 21.499 | 52.18 | 6.650 | 16.14 | 2.000 |
| Control . . | 1 | 9.825 | 7.854 | 79.94 | 5.159 | 52.51 | 1.858 | 18.91 | 0.153 |
| | 2 | 10.700 | 8.078 | 75.50 | 4.967 | 46.42 | 2.090 | 19.53 | 0.105 |
| | 3 | 16.200 | 11.797 | 72.82 | 7.757 | 47.88 | 2.681 | 16.55 | 0.432 |
| | 4 | 17.200 | 12.877 | 74.87 | 7.927 | 46.09 | 3.381 | 19.66 | 0.175 |
| | 6 | 21.800 | 16.945 | 77.73 | 10.515 | 48.23 | 4.342 | 19.92 | 0.122 |
| | 9 | 31.300 | 23.564 | 75.28 | 15.199 | 48.56 | 5.995 | 19.15 | 1.200 |

* Mean of both creep-fed and control lambs.

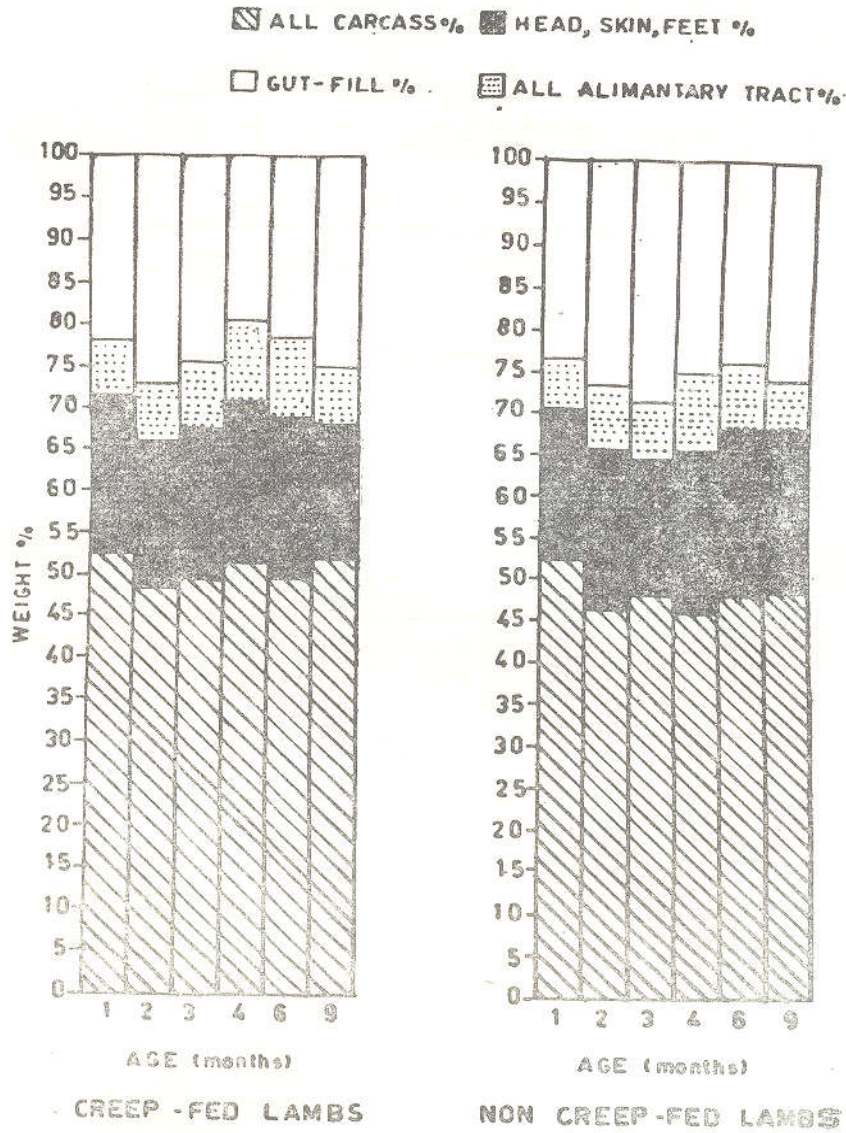


FIG. 1.—Weights of Different Parts of the Body as Percentages of Live-weight.

TABLE 3.—ABSOLUTE FRESH WEIGHTS (gm.) OF THE DIFFERENT ORGANS AND EXPRESSED AS A PERCENTAGE TO THE CORRESPONDING WEIGHT AT THE AGE OF ONE MONTH

| Treatment | Age | Spleen (gm.) | Spleen % | Liver (gm.) | Liver % | Kidneys (gm.) | Kidneys % | Heart (gm.) | Heart % |
|-----------|-----|--------------|----------|-------------|---------|---------------|-----------|-------------|---------|
| Creep-fed | 1* | 21 | 100 | 175 | 100 | 53 | 100 | 63 | 100 |
| | 2 | 32 | 152 | 333 | 190 | 75 | 142 | 94 | 149 |
| | 3 | 28 | 133 | 353 | 202 | 82 | 155 | 79 | 12 |
| | 4 | 39 | 186 | 358 | 205 | 88 | 166 | 96 | 152 |
| | 6 | 49 | 233 | 430 | 246 | 105 | 198 | 107 | 170 |
| | 9 | 57 | 271 | 669 | 382 | 144 | 272 | 142 | 225 |
| Control | 1 | 21 | 100 | 175 | 100 | 53 | 100 | 63 | 100 |
| | 2 | 26 | 124 | 157 | 90 | 63 | 119 | 56 | 89 |
| | 3 | 21 | 100 | 285 | 163 | 76 | 143 | 62 | 93 |
| | 4 | 28 | 133 | 259 | 148 | 51 | 96 | 66 | 105 |
| | 6 | 13 | 157 | 33 | 194 | 84 | 158 | 82 | 130 |
| | 9 | 39 | 186 | 400 | 229 | 105 | 198 | 115 | 183 |

* Mean of both creep-fed and control lambs.

TABLE 4.—WEIGHTS OF DIFFERENT ORGANS AS A PERCENTAGE TO LIVE-WEIGHT

| Treatments | Age (months) | Live-weight (kgs) | Spleen % | Liver % | Kidneys % | Heart % |
|---------------------|--------------|-------------------|----------|---------|-----------|---------|
| Creep-fed | 1* | 9.825 | 0.214 | 1.78 | 0.54 | 0.64 |
| | 2 | 15.500 | 0.207 | 2.15 | 0.48 | 0.61 |
| | 3 | 18.500 | 0.151 | 1.91 | 0.44 | 0.43 |
| | 4 | 20.000 | 0.195 | 1.79 | 0.44 | 0.48 |
| | 6 | 26.000 | 0.189 | 1.65 | 0.40 | 0.41 |
| | 9 | 41.020 | 0.138 | 1.62 | 0.35 | 0.35 |
| Control | 1* | 9.825 | 0.214 | 1.78 | 0.54 | 0.64 |
| | 2 | 10.700 | 0.243 | 1.47 | 0.24 | 0.52 |
| | 3 | 16.200 | 0.124 | 1.66 | 0.12 | 0.38 |
| | 4 | 17.200 | 0.163 | 1.51 | 0.16 | 0.38 |
| | 6 | 21.800 | 0.151 | 1.56 | 0.15 | 0.38 |
| | 9 | 31.300 | 0.125 | 1.28 | 0.13 | 0.37 |

* Mean of both creep-fed and control lambs.

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تأثير الدفع الغذائي للحملان على تطور الذبيحة والاحشاء

الملخص

لقد توصلت البحوث العلمية الى أنه ليس كافيا للحكم على قدرة الاغنام لانتاج الضأن ان تقدر اوزانها فحسب بل يجب ان يكون ذلك من واقع تقدير ماهية ذبائحها . ولذلك جاء هذا البحث الذي يهدف دراسة مدى تأثير الدفع الغذائي للحملان على تطور الذبيحة والاحشاء .

وقد شمل هذا البحث اثني عشر حملا من الأغنام الاوسيمي بمحطة الانتاج الحيواني بكلية الزراعة بالجيزة اختيرت من تجربة قسمت عشوائيا الى مجموعتين دفعت احداها غذائيا ووضعت المجموعة الأخرى تحت ظروف التغذية العادية واستمرت التجربة منذ أن بلغت الحملان الشهر الأول من عمرها الى أن بلغت عشرة شهور .

وعند عمر واحد ، ٢ ، ٣ ، ٤ ، ٦ ، ٩ أشهر ذبح حمل من كل مجموعة وقدرت به وزن الاجزاء المختلفة والاحشاء وكذلك نسبة التصافي ولقد توصلت هذه الدراسة الى النتائج الآتية :

(١) ان الحملان التي دفعت غذائيا تفوقت في الأعمار المختلفة على قريناتها التي لم تدفع غذائيا من حيث الوزن الحي وكذلك نسبة التصافي .

(٢) ان نسبة وزن الرأس والجلد والأرجل الى الوزن الحي كان أكبر في الحملان التي لم تدفع غذائيا عنها في الحملان التي وضعت تحت مستوى غذائي مرتفع .

(٣) ان الاحشاء الداخلية (الطحال والكليتين والكبد والقلب) بالنسبة للحملان التي دفعت غذائيا فاقت في وزنها الاحشاء الداخلية للحملان المقارنة .

هذا بينما كانت نسبة الاحشاء الى الوزن الحي تتناقص كلما تقدمت الحملان في العمر بفض النظر عن المعاملة الغذائية .