

EFFECT OF BODY CONDITION SCORE OF HAMDANI AND KARADI EWES ON THEIR REPRODUCTIVE AND MEAT PRODUCTIVITY OF THEIR LAMBS

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ABSTRACT

Eighty five Hamdani (H) and 41 Karadi (K) ewes were included in four body condition score (BCS) groups, to study the effect of ewe BCS at tapping on their fertility, lambing percentage, milk production, lamb weights, carcass weight and meat production and their financial returns. Ewes were fed 400g /day/head of concentrate ration which increased to 1 kg/day/head during lactating season. Lambs were on concentrate free feeding from weaning to slaughter. Ewes in BCS3 were found to have significant ($p < 0.05$) superiority than those in BCS1 and 4 in fertility percentage and than both breed ewes in BCS1 and K ewes in BCS4 in lambing percentage . The significant ($p < 0.05$) high milk production of the two breed ewes in BCS3 hence for significant ($p < 0.05$) heavier lamb weaning weight and ADG for H and K breed when compared to those in BCS1 and BCS2 .BCS3 group drew a head of others in weaning percentage and lamb weaning weight to original ewe number ratio for H and K breed. While the lower records were observed for both breed lambs in BCS1 . H and K lambs in BCS3 last 145 and 162.5 days to slaughter which were significantly ($p < 0.05$) shorter than those 200.7 , zero days of both breeds in BCS1 respectively. Carcass weight of H and K lambs in BCS3 and BCS1 were 13.8, 13.3 kg and 11.8, zero kg respectively. While carcass weight to original H and K ewe number ratio in BCS3 and BCS1 was found to be 12.4, 11.8 and 5.1, 0.0 respectively. So the financial returns of the BCS1,2,3 and 4 could be summarize 61200, 93600 ,148800 and 109200 ID for the H breed and 0.0, 106800, 141600 and 72000 ID for K breed respectively.

INTRODUCTION

The body weight can give an idea about the ewe condition, but with a different body sizes the weight will be changed at a same body condition score (BCS). It is very difficult and may be expensive to weigh a large number of animals in a big herd, so the BCS can be used as a guide at breeding season or to predict the amount of meat can be dressed before slaughtering and marketing the animals. Hand assessment is an easy and useful measurement used by the butcherman to buy lambs for slaughtering, and by the farmer to manage the ewes at the mating season. Six degrees for the BCS were mentioned in Australia by Jeffries (1961) and Russel *et al* (1969). The British MLC (1981) gave 5 degree description for BCS. Sheep BCS was found to be highly correlated to their reproductivity (Gunn *et al* 1991) . Gunn *et al* (1969) found a significant effect of body condition of the ewe on the number of lambs born, and lambing percentage increased 6-10 % when BCS improved one degree (Pattison 2002). Improving the BCS by flushing before breeding season is necessary (Kazzal and AL-Saigh 1980), because it activates the most important reproductive characters such as fertility, liveability and prolificacy (Dahal,1987). The idea of this study was planed to study the effect of the BCS on the productivity of the local Hamdani (H) and Karadi (K) ewes.

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MATERIALS AND METHODS

Eighty five ewes (44 Hamdani (H) and 41 karadi (K)) were assigned at the agriculture farm and graded by handl assessment using MLC (1981) scor (1= very thin and 5= over fat), which described by pattison (2002) . All the ewes were weighed and singed in

four grading groups (Table 1). All the ewes were given 400 g / ewe / day concentrate ration 55% barley seeds, 35% wheat bran, 8% cotton seed meal and 2% salt, limestone and vitamins) during mating and pregnancy period, then increased to 1 kg/ewe/day after lambing with a usuall daily grazing. Free concentrate feeding was allowed for the lambs from weaning to slaughter. Fastening ewe body weight and condition score were recorded at the beginning of the experiment and regular every 15 days intervals. All the lambs were weighed within 24 hours after birth and then every 15 days until all the lambs were slaughtered . Milk production measurements commenced in the 2nd week after lambing and regular weekly for 20weeks. All the lambs were killed at average live body weight of 31 kg. Cold Carcase weight and rib eye area were taken and the planemeter was used to determine the rib eye area . Dressing percentage and financial returns of each BCS group were calculated. All the data collected were analyzed by using the SAS system (Anonymous , 2001) . Duncan's multiple range test (1955) method at 5% level was used for significant differences calculations between means of the treatments if the analysis of variance indicated significant differences. The following mathematical model was fitted for all traits.

$$Y_{ijk} = \mu + S_i + B_j + e_{ijk} , \text{ when}$$

μ = the over all mean S_i = the i th body condition scores

B_j = the j th breed e_{ijk} = the random error effect.

Table (1): Number of H and K ewes in each BCS group.

| Breed | H | | | | | K | | | | |
|--------|-----|----|----|----|---|---|----|----|----|---|
| | BCS | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| Number | 9 | 13 | 10 | 12 | 0 | 6 | 11 | 12 | 12 | 0 |

RESULTS AND DISCUSSION

Fertility and lambing percentage: The statistical analysis indicated a significant superiority in fertility percentage 1.00 for H and K ewes in BCS3 as compared with those in BCS 1 and 4 within breed. Fertility percentage of H and K ewes in BCS2 were found to approach one another (Table2), and both were significantly higher than those in BCS1 and 4 of the same breed. H ewes in BCS1 and 4 gave a significant higher fertility percentage 0.83 and 0.88 than those 0.33 and 0.66 of the K ewes respectively.

Lambing percentage of K ewes in BCS1 0.33 was significantly lower than those of the H ewes 0.78, which was significantly behind the other grades

of the H ewes. K ewes in BCS1 showed a significant less lambing percentage than the ewes in BCS4 and both were significantly less than the others. Generally, H ewes showed a superiority lambing percentage against the K ewes in all the grades. The highest lambing percentage 1.00 was found for the H ewes in BCS2 and 3, which may correlated to their vigourity and biological activities increasing the hormones level in blood, which enhanced the rate of ovulation and other reproductive activites. An opposite situation may occur in poor grade ewes. The high fat tissue percentage attendant to BCS 4 may effect negatively by covering the ova membrane and reduce the membrane sensitivity against FSH and LH secretion which prevent the growth and development of the ova and the ovulation and even the fetus growth in the uterus (Rhind *et al* 1985, Torre *et al* 1991). These findings are in agreement with those mentioned by Salman *et al* (2001), Naziha *et al* (2001), Torre *et al* (1991) which showed a superiority of grade 2 and 3 or good grade (Raouff,2003) in comparing with the other grades in fertility and lambing percentage .

Table (2) : Mean ± S.E of fertility and lambing percentage .

| Breed grade | Number of ewes | | Fertility % | | Lambing % | |
|-------------|----------------|-----|---------------------|--------------------|--------------------|--------------------|
| | H | K | H | K | H | K |
| 1 | 9 | 6 | B a 0.88 ± 0.11 | C b 0.33 ± 0.02 | B a 0.78 ± 0.15 | C b 0.33 ± 0.02 |
| 2 | 13 | 11 | AB 0.92 ± 0.07 | A 0.91 ± 0.09 | A a 1.00 ± 0.16 | A b 0.64 ± 0.15 |
| 3 | 10 | 12 | A 1.00 ± 0.01 | A 1.00 ± 0.01 | A a 1.00 ± 0.15 | A b 0.75 ± 0.15 |
| 4 | 12 | 12 | BC a 0.83 ± 0.11 | B b 0.66 ± 0.14 | A a 0.91 ± 0.18 | B b 0.50 ± 0.15 |
| 5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

*Means in each colum with capital letters are differs significantly.

**Means in each row with small letters are differs significantly.

Milk production: Milk production is consider a very important factor which influence the growth and weaning lamb weight, because milk is the only food of new-born lambs up to a certain age and it is a supplementary food up to weaning time (Dahal 1987). Figure (1) declare that the H ewes in BCS3 gave a significant better daily milk production 756.3 g when comparing with those in BCS1, 412.2 g , which was significantly less than the ewes in BCS2 and 4 too. Concedering the original number of the H ewes for milk production calculations , ewes in BCS3 gave 680.7 g/day significantly greater milk amount comparing with the others (figure 2), and the ewes in BCS1 had 320.6 g/day significantly less milk production than the others, while the ewes in BCS2 and 4 did not difer significantly in daily milk production when they gave 495.2 and 491.3 g, respectively. The K ewes in BCS3 showed significant high milk production 665.0 g/ day than the others, while the K ewes in BCS1 was

significantly less in daily milk production 426.0 g than the others (figure 1). Concedering the daily milk production according to the original K ewes involved in the trial, ewes in BCS3 showed significant greater 443.3 g daily milk production comparing with BCS 1 , 2 and 4 which differed significantly with each others by mean 71.0, 404.3 and 323.8 g/day respectively . The unadequacy amount of milk produced by the ewes in BCS1 and the numerous amount of the ewes is BCS3, led to a shortage in lamb feeding, growth and even death in the 1st, while it was satisfied and superior in the 2nd most the lambs death occurred before weaning . These results are supporting those mentioned by Lopez *et al* (1990) Raouff (2003), who found a significant correlation between the ewe BCS and their milk production, but a disagreement noticed with the results found by Hossamo et al(1986).

Lamb and meat production: Lamb is known as a basic meat production unit, and his weaning and slaughter weight depends on birth weight and daily body gain, which significantly correlated with dam milk production. So the days taken to reach the slaughter weight variate according to that. The results indicated that the effect of dam's BCS on lamb survival and growth performance is considered to be significantly effective, especially during the first few weeks of life when lambs are more dependent on their dam's milk yield for their nutrient requirements. More than 50% of the Lambs born for the H ewes in BCS1 where dead and the rest reach weaning weight 23.3 kg at 120 days old (Table 3), and all the lambs born for the K ewes in BCS1 were dead few days after birth (Table 4). On contrast, lambs in BCS3 showed a significant higher ADG and weaning weight than those in BCS1 and than those in BCS2 in ADG only.

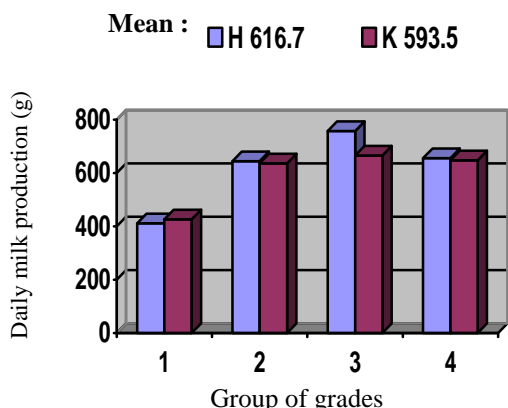


Figure (1). Effect of BCS in average daily milk production for milking ewes (20week)

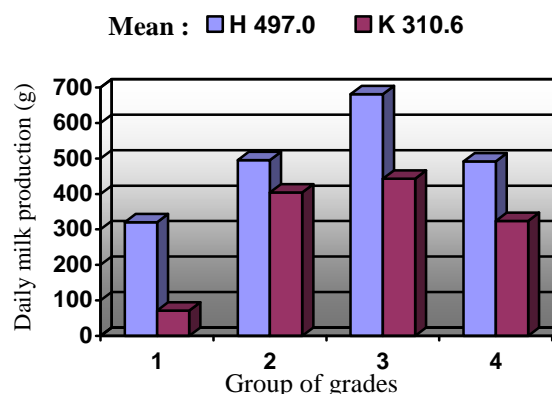


Figure (2). Effect of BCS in average daily milk production for original ewes number (20week)

| Group of grade | Number of born lambs | Weights (Kg) | | | | Number of weaned lambs | Average daily gain (g) | weaned lambs % ¥ | Lamb Production Kg /ewe ¥¥ |
|----------------|----------------------|--------------|----------|----------|--------------------|------------------------|------------------------|------------------|----------------------------|
| | | birth | 56 days | 90 days | 120 days (weaning) | | | | |
| 1 | 7 | 4.1±0.2 | 13.0±1.6 | 18.3±2.4 | B 23.3±2.6 | 3 | C 160±2.0 | 42.9 | C 8.4±1.2 |
| 2 | 13 | 4.7±0.6 | 14.8±1.3 | 20.6±1.1 | AB 25.7±0.4 | 8 | B 175±3.0 | 61.5 | B 15.8±1.5 |
| 3 | 10 | 5.4±0.1 | 15.9±0.8 | 21.5±1.2 | A 28.2±0.8 | 9 | A 190±7.0 | 90.0 | A 25.4±0.5 |

| | | | | | | | | | |
|---|----|---------|----------|----------|----------------|---|---------------|------|------------|
| 4 | 11 | 4.4±0.2 | 13.0±1.3 | 19.1±0.8 | AB 26.0±0.2 | 8 | AB 180±2.0 | 72.7 | B 17.3±1.1 |
|---|----|---------|----------|----------|----------------|---|---------------|------|------------|

Table (3): Mean ± S.E of H lambs body weight .

*Means in each column with capital letters are differs significantly.

¥Weaned/ born lambs number.

¥¥wened lamb weight Kg / original number of ewes in the group.

Table (4): Mean ± S.E of K lambs body weight.

| Group of grade | Number of born lambs | Weights (Kg) | | | | Number of weaned lambs | Average daily gain (g) | weaned lambs % ¥ | Lamb Production Kg /ewe ¥¥ |
|----------------|----------------------|--------------|----------|----------|--------------------|------------------------|------------------------|------------------|----------------------------|
| | | birth | 56 days | 90 days | 120 days (weaning) | | | | |
| 1 | 2 | 4.1±0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 2 | 7 | 4.5±0.3 | 15.2±1.1 | 23.6±0.5 | 24.9±0.9 | 5 | B 170±0.7 | 71.4 | |
| 3 | 9 | 5.0±0.3 | 16.2±1.3 | 22.5±1.4 | 27.2±1.3 | 8 | A 185±10.0 | 88.9 | |
| 4 | 6 | 4.8±0.6 | 14.8±2.3 | 20.5±2.5 | 25.8±1.8 | 3 | A B 175±10.0 | 50.0 | |

*Means in each column with capital letters are differs significantly.

¥Weaned/ born lambs number.

¥¥ wened lamb weight Kg / original number of ewes in the group.

Lambs in BCS3 showed a higher weaning percentage for the H 90% and K 88.9% breed as compared to the general average percentage for the H 66.8% and K breed 52.6%. Lambs in BCS3 showed significant greater ADG for H 190 g/day and K breed 185 g/day comparing with those in BCS1 and 2, when the general ADG of the two breeds were 176 and 132.5 g respectively. Considering the lamb weaning weight to the original ewe number used initially in the study, the ewes in BCS3 weaned significantly better for H 25.4 kg/ewe and K 18.1 kg/ewe when compared to those weaned for the H and K ewes in BCS1,2 and 4 which weighed 8.4, 0.0, 15.8, 11.3 and 17.3 , 6.5 kg/ewe respectively. These results agreed with those concluded by Raouff (2003) who found a significant (p<0.05) effect for the ewe BCS on lambs weaning weight, and disagreed with those reported by Hossamo *et al* (1986) who mentioned that the ewe BCS had no effect on lambs weaning weight .Generally results indicated that the H ewes were better than the K ewes in livability and mothering ability which reflected in lambs growth characters. The means in Table (5 and 6) show that the lambs in BCS3 gained significantly heavier body weight after weaning than those in BCS1 and 2, So the H and K lambs slaughtered at 31.6 and 31.3 kg when they were 145 and 162 days old respectively. And that was significantly shorter than the H and K lambs in BCS1 , 200.7 and 0.0 days and the K lambs in BCS2 ,

200.7 days . Lambs in other groups last 191 days to reach 30.5 kg slaughter weight. Hamdani lambs in BCS3 had a significant advantage in carcass weight 13.8 kg over those 11.8 kg produced in BCS1 and both did not differ significantly with those in BCS2 ,12.7 kg and 4 ,12.5 kg . While the K lambs in BCS1 failed to produce any carcass, and the superiority of BCS3 ,13.3 kg was not significant in comparing with those produced for BCS2 , 12.5kg and 4 , 11.9 kg. With the exception of K lambs in BCS1, the H and K lambs in BCS3 have killed out insignificantly better 43.7 and 42.5% than the others. Rib eye area showed a significant superiority for the H 9.9 cm² and K 9.7 cm² carcasses in BCS3 comparing with those 7.7 , 7.8 and 7.7 cm² found for the H carcasses in BCS1 and 2 and K carcasses in BCS2. The rib eye area of the both breed carcasses in BCS4 did not differ significantly with the others.

Financial Returns: A same management system was used for all the study sheep groups, and the only variable item was the carcass weight produced for each BCS group, so the cost of all the trial groups is considered to be same and the comparative degree can be based on the amount of meat sold for each group. It is well known that the sheep meat price in the market worth 12000 Iraqi Dinar (ID)/kg, and referring to Table (5 and 6), the best financial returns based on the original number of the ewes were found in BCS3 which gave 148800 ID/ewe for H breed and 141600 ID/ ewe for K breed. The ratio values for the other BCS groups to BCS3 have calculated for the H and K breed in BCS4 to be 73.4, 50.8%, and in BCS2, 62.9, 75.4% and in BCS1, 41.1, 0.0% respectively.

Table (5): Mean \pm S.E of Carcass characteristics of H lambs.

| group of grade | Live weight (Kg) | days to slaughter | Carcass weight (Kg) | Dressing percentage % | Longissimus muscle area (cm ²) | carcass yield Ratio ¥ | In come (ID) |
|----------------|------------------|------------------------|---------------------|-----------------------|--|-----------------------|--------------|
| 1 | 29.3 \pm 0.3 | B 200.7 \pm 29.6 | B 11.8 \pm 1.0 | 40.3 \pm 4.0 | B 7.7 \pm 0.1 | 5.1 | 61200 |
| 2 | 30.6 \pm 0.4 | AB 190.3 \pm 22.9 | AB 12.7 \pm 0.6 | 41.5 \pm 2.3 | B 7.8 \pm 0.1 | 7.8 | 93600 |
| 3 | 31.6 \pm 0.7 | A 145.0 \pm 23.5 | A 13.8 \pm 0.6 | 43.7 \pm 0.9 | A 9.9 \pm 0.2 | 12.4 | 148800 |
| 4 | 30.6 \pm 0.6 | AB 190.8 \pm 18.8 | AB 12.5 \pm 0.8 | 40.8 \pm 2.2 | AB 8.4 \pm 0.2 | 9.1 | 109200 |

*Means in each column with Capital letters are differs significantly.

¥ : total carcass weight / original number of ewes.

Table (6): Mean \pm S.E of Carcass characteristics of K lambs.

| group of grade | Live weight (Kg) | days to slaughter | Carcass weight (Kg) | Dressing percentage % | Longissimus muscle area (cm ²) | carcass yield ratio ¥ | In come (ID) |
|----------------|------------------|-----------------------|---------------------|-----------------------|--|-----------------------|--------------|
| 1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | 31.2 \pm 0.2 | B 200.7 \pm 10.1 | 12.5 \pm 0.4 | 40.1 \pm 0.1 | B 7.7 \pm 0.5 | 8.9 | 106800 |
| 3 | 31.3 \pm 0.6 | A 162.5 \pm 13.2 | 13.3 \pm 0.3 | 42.5 \pm 1.3 | A 9.7 \pm 0.2 | 11.8 | 141600 |
| 4 | 30.3 \pm 0.3 | AB 191.1 \pm 8.1 | 11.9 \pm 0.5 | 39.2 \pm 2.2 | AB 8.0 \pm 0.1 | 6.0 | 72000 |

*Means in each column with Capital letters are differs significantly.

¥ : total carcass weight / original number of ewes.

الخلاصة

تأثير تدرج جسم النعاج الحمدانية والكرادية في أدائها الإنتاجي وإنتاجية مواليدها من اللحوم
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ضمت التجربة ٨٥ نعجة حمدانية وكرادية ، بأربع تدريجات جسم من قطيع حقول كلية الزراعة لدراسة تأثير تدريج جسم النعجة عند التسفيد في إنتاجيتها وحملاتها. غذيت الأغنام على ٤٠٠ غم/يوم/نعجة علفاً مركزاً خلال موسم التناسل وعدلت الى ١ كغم خلال موسم الرضاعة بالإضافة إلى الرعي . وقدمت العليقة بشكل حر للحملان من الفطام الى الذبح . تميزت نعاج مجموعة التدريج ٣ معنوياً (١ > ٥ ٠) على مجموعتي التدريج ١ و ٤ لكلا النوعين بنسبة الاخصاب وعلى نعاج كلا النوعين في التدريج ١ وعلى نعاج الكرادى في التدريج ٤ بنسبة الولادة . ان التفوق المعنوي (١ > ٥ ٠) في انتاج الحليب لنعاج كلا النوعين في التدريج ٣ ادى الى تفوق حملاتها معنوياً (أ١ > ٠) بوزن الفطام ومعدل الزيادة الوزنية اليومية مقارنة بالتدريجين ١ و ٢ . كما حققت مجموعة التدريج ٣ أعلى نسبة حملان مفطومة ونسبة إنتاج الحملان إلى عدد النعاج الاصلي في النوعين الحمداني والكرادي في حين كانت النسبة الأقل في مجموعتيها بالتدريج ١ . استغرقت حملان مجموعة التدريج ٣ في النوعين الحمداني والكرادي ١٤٥ و ١٦٢ يوماً لتصل إلى وزن الذبح ٣١ و ٣١ كغم وبفارق معنوي (أ ٠ > ٥ ٠) عن حملان التدريج ١ بمعدلاً ٢٠٠ و صفر يوم على الترتيب . وجدت معدلات أوزان ذبائح حملان مجموعة التدريج ٣ للنوعين الحمداني والكرادي ١٣ و ١٣ كغم أثقل معنوياً (أ١ > ٠) من معدلاتها ١١ و صفر كغم في التدريج ١ على التوالي . بلغت افضل المردودات المالية لبيع ذبائح حملان التدريج ٣ للنوعين الحمدانية والكرادية ١٤٨٨٠٠ و ١٤١٦٠٠ دينار عراقي على التوالي . بينما انخفضت نسبة مردودات مجموعة التدريج ١ الى ٤١ و صفر % والتدريج ٢ الى ٦٢ و ٧٥ % والتدريج ٤ الى ٧٣ و ٥٠ % مقارنة بالتدريج ٣ على التوالي.

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