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A Study on the Effect of Two Different Housing System on Performances of Holstein Calves

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Abstract: In this study, it has been aimed that, the effect of group versus individual housing system on holstein female calves performances. Twenty-five female calves were reared under two types of housing (individual, I and group, G). The calves were randomly distributed in the two groups on the basis of their birth weight. There were three groups, each of groups of five calves was housed in three separate group pens (5.88×5.20 cm) with feeding and watering facilities. The calves were fed with colostrum for first 3 days before allotting to standard milk feeding schedules of the farm Ad libitum Calf starter and alfaalfa hay was introduced from the first week and was continued till the end of the experiment (10 weeks). The mean±SEM BW of calves at birth and weaning 32.07±0.621 kg and 68.53±1.561 for group housed calves and 32.60±0.819 and 67.00±1.534 kg for individually housed calves (NS). There were no differences between the groups aspect of weight during the experiment. The calves were housed as a group consumed more starter during the experimental periods; however these differences were non-significant statistically.

Key words: Group, individual, housing, calf performances, dairy calves

INTRODUCTION

One of the most important tasks on any dairy farm is calf rearing. Calf care is time consuming work in dairy unit, especially when first quality calves is main goal. The most labor-intensive work involves feeding, watering, bedding and health care procedures. Successful calf rearing is the result of managing all the risk factors of good husbandry, nutrition, feeding, disease and stressful conditions[1]. Avoiding stressful conditions during the calf rearing period is the key factor of a successful calf-rearing program. This can be accomplished by making the calf's transition to a new environment smoother and scheduling health care practices either several weeks before stressful conditions. One of the major changes for a calf during the weaning period is transfer from an individual housing situation to a group housing facility. Calf hutches are one of the most effective management practices for improving health and growth of calves prior to weaning[1,4]. They have been used successfully for many years throughout the world and remain one of the most popular options for housing calves in intensive dairy farms. Over the world, laws and regulations have been written that mandate how animals must be housed, managed and even fed to ensure that their behavior is as normal as possible. Group housing involves less restriction on the behaviour of calves and allows for greater social contact between calves. However, there are inherent difficulties in providing individual care for each calf and there is increased risk of disease transmission, particularly during the first 4 weeks of life. Calves in group pens require a higher degree of husbandry to ensure their health and well-being.

Calves are herd animals, that they must be housed in groups to allow normal social behavior and social development[4,5]. On a typical dairy farm calves are separated from their mothers within 24 h of birth. These young dairy calves are usually moved to individual pens or hutches and fed about 2 L of milk by bucket twice a day[1,6]. Recent research have shown that even small changes in these calf rearing practices can produce improvements in calf growth and well being[5]. Using nipple systems to provide more milk also facilitates group housing. If properly managed, calves direct their sucking to the nipples and not to pen mates.

Group rearing allows for early social interactions that have been shown to be important in the development of normal social responses later in life. Despite apparent advantages of group housing, most dairy farms keep their calves in individual pens or calf hutches, in part due to concerns about reduced weight gains, increased incidence of disease and behavioral problems such as cross-sucking. Recently studies showed that for a well-managed calf unit these problems can be avoided.

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In this study, it has been aimed that, the effect of group versus individual housing system on holstein female calves performances.

MATERIALS AND METHODS

Animal materials were female Holsteins calves at University of Çukurova, Faculty of Agriculture Research Farm, Twenty-five female calves were reared under individual (10) and group housing (15) systems. The calves were randomly distributed in the two groups on the basis of their birth weight. All calves were kept together with their mothers for the first 3 days after calving and then were housed in individual pens in calf hutches. The calves were fed with colostrum for first 3 days before allotting to standard m I l k feeding schedules of the farm (milk, 1/10th of body weight (BW) during 4 days to 4 weeks, 1/15th of BW during 5-6 weeks and then, 1/20th of BW to wean at 8 weeks of age). In addition, they were received a calf starter, good quality alfalfa straw ad libitum. The starter was 87.7% dry matter with 16.5% crude protein, 9.7% crude cellulose and 3.2% crude fat. Alfaalfa straw was 89.7% dry matter with 15.0% crude protein, 26.0% crude cellulose and 3.4% crude fat.

The individual group were housed in fiberglass calf hutches (106 width X 118 length X 140 cm height) with individual paddock (136 width X 120 length X 90 cm height) for each calves (Fig. 1).

In the group housing, group of five calves was housed in three separate group pens (5.88 m width X 5.20 m length X 1.75 m height per group) with shade, feeding and watering facilities (Fig. 2). All pens had soil floors which were straw bedded. Experimental groups were kept under the trees which provides natural shadow for the calves.

Milk was offered twice a day in buckets for individual housing calves and with a barrel feeder for group housing calves. All utensils were washed with warm water after each feeding to minimize risk of transmission of infectious organisms among the calves. For group feeding, a teat soft, ten pink rubber were fixed to the bottom at the height of 75 cm barrel feeder. The teat was 100 X 30 mm with X-shaped slit in the rounded tip. Manual and visual inspection suggested that the hardness of the rubber and the size of the terminal slit did not vary between teats and milk was sequeezed through by hand no variation in the ease of flow was apparent. Calves were weighed at birth and at the beginning of every 14th day for weaning period. Individual calf starter consumption and refused were recorded weekly for each calf. Diarrhoea was recorded on a daily basis aspect of faecal consistency changes. One person just observed four times a day

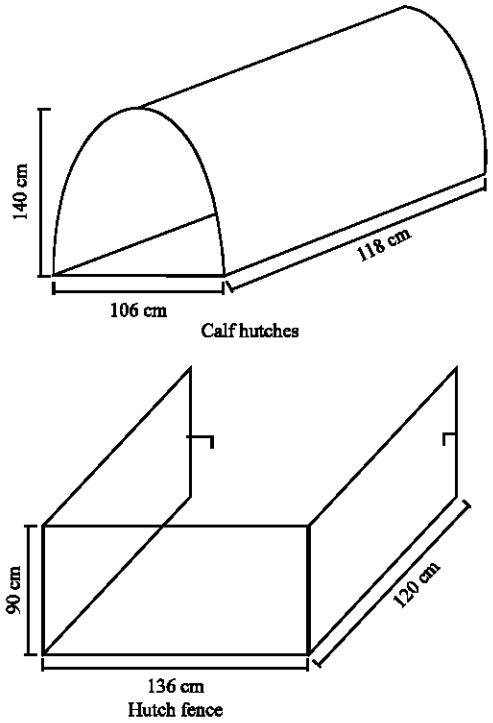

Fig. 1: The dimensions of calf hutches and hutch fence

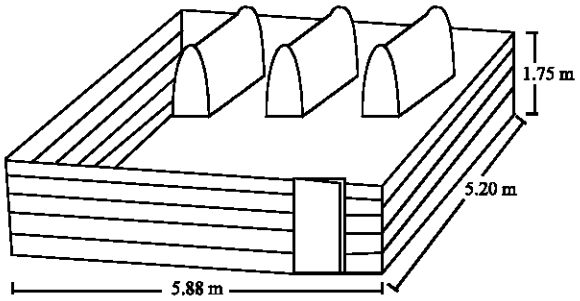

Fig. 2: The dimensions of group pen

experimental groups health situation during the experiment to prevent disease outbreak. One person observed animals during the feeding time and after for cross sucking behaviour of the calves. Data for groups of calves were averaged to give one value for each group. Each group consist 5 calves. Group values were then used to generate treatment means and for statistical comparisons. The experiment was carried out according to the coincidence parcels experiment plan and analyzed by using SPSS programme.

RESULTS AND DISCUSSION

Average daily weight gain values were ranged between 346-568 g for group housed calves while 346-546

Table 1: Body weight, weight gain, starter intake and starter to gain ratio values of the experimental groups

		Group (n=15)		Individually (n=10)		
	Age (days)	Mean±SEM	Range	Mean±SEM	Range	p-value
Body weight (kg)	Birth weight	32.07± 0.621	29-37	32.60±0.819	28-36	0.603
	14	37.80±0.991	32-44	38.50±1.529	32-46	0.691
	28	43.00±1.242	36-52	43.70±2.011	37-52	0.757
	42	51.53±1.612	42-63	51.90±2.11	45-62	0.890
	56	60.33±1.750	49-72	59.60±1.978	53-70	0.787
	Weaning weight	68.53±1.561	57-78	67.00±1.534	62-75	0.510
Gain (g d^{-1})	0-14	358.00±38.32	125-625	368.75±54.69	187-625	0.874
	14-28	346.67±26.98	200-533	346.67±45.32	133-600	1.000
	28-42	568.89±37.86	266-733	546.67±25.92	466-733	0.666
	42-56	517.65±20.05	352-647	452.94±21.56	352-588	0.043
	56-70	512.50±23.78	375-625	462.50±41.87	312-687	0.277
	0-70	434.13±13.29	309-523	409.52±11.79	369-488	0.209
Starter intake (kg d^{-1})	0-14	119.00±5.78	106-131	113.30±11.41	87-139	0.630
	14-28	290.33±15.93	256-324	271.50±14.55	238-304	0.419
	28-42	465.33±1.08	463-467	467.50±33.47	391-543	0.937
	42-56	701.66±10.62	678-724	657.60±43.27	559-755	0.250
	56-70	938.00±6.59	923-852	924.00±5.57	911-936	0.145
Starter to gain ratio	0-14	404.93±60.76	274-535	374.90±58.15	243-506	0.737
	14-28	914.93±88.69	724-1105	960.60±185.45	541-1380	0.808
	28-42	892.53±83.05	714-1070	875.70±79.35	696-1055	0.890
	42-56	1392.93±70.67	1241-1544	1476.90±108.79	1230-1722	0.504
	56-70	1890.40±95.33	1685-2094	2158.80±203.04	1699-2618	0.197
Diarrhoea case	0-70	2		1		

for individually housed calves during the experiment. Differences between the average daily weight gain of the groups was not significantly important except during 42-56 days. In this experiment there was no signs of deceases other than diarrhoea and the level of the diarrhoea was recorded just 2 calves days up to 3 weeks of age with no difference between the groups (Table 1).

Karakök and Gökçe[7] reported that daily weight gain averages from birth to 2 months of age were 367.55; 319.11 and 253.83 g and the differences between the groups were not statistically significant ($p<0.05$) for calf hutches groups. Görgülü *et al.*[8] found that a decreasing tendency (380 g d^{-1} for control, 363 g d^{-1} for 0.5 g group and 341 g d^{-1} for 1 g) in daily gain of calves as the L-carnitine level increased. Göncü and Özkütük[9] indicated that calves reared in the hutches made from fiberglas material gave the best result (0.613), while those reared double layer tin-plate was the worst (0.511). The average daily weight gain values that are reported in this study were lower than the values that were reported by Tümer[3] , Göncü and Özkütük[9] however, they are similar to the ones reported by Görgülü *et al.*[8], Yanar *et al.*[10], Karakök and Gökçe[7]. This differences attributed that the 2 weeks longer weaning period of Tümer[3]. Our findings show similar result with Babu *et al.*[5] reported that group housing reflects better welfare as compared to that in individual housing.

Many big dairy farms could be remodeled to improve labor efficiency and increase income with modest investment. Group housing provides improved access to space, allowing for more vigorous activity and play. Grouping calves also reduces the labor associated with cleaning calf pens and calf feeding. When necessary precautions are provided group rering system is able to take important role to improve calf reraing efficiency.

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