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## Effect of social interaction on performance of Sahiwal calves

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### Abstract

Dairy calves are separated from the dam soon after birth and housed in individual pens. This study was conducted to investigate the effect of social interaction on performance of Sahiwal calves. For this, six days old Sahiwal calves (n=24) were selected from Sahiwal herd of National Dairy Research Institute, Karnal, Haryana, India and divided initially into two groups i.e. individually housed (group 1, having 16 calves) and group housed (group 2, having 8 calves). After six weeks of age, third group was formed by shifting calves (n=8) from group 1 i.e. late pair housed (group 3, having 4 pairs). Total dry matter intake, average daily gain and health parameters were also analysed by using SPSS 21. Results revealed that treatment groups did not have significant effect on total dry matter intake, average daily gain and growth of calves. However, cases of illness was slightly higher in group housed calves. So, overall it can be concluded that there was less impact of social housing on performance of calves.

**Keywords:** Calves, illness, social, housed

### 1. Introduction

Dairy calves are separated from the dam soon after birth and housed in individual pens. There is very little knowledge about how social housing benefit dairy calves. Several studies have observed increased weight gains for group-housed dairy calves as compared to individually housed calves during the milk feeding and weaning periods (e.g., Chua *et al.*, 2002; Xicatto *et al.*, 2002; Tapki, 2007) [3, 12, 9], whereas other studies have observed no effect (Færevik *et al.*, 2007) or increased weight gains for individually housed calves (e.g., Terré *et al.*, 2006). The increased weight gain for calves housed in groups is often attributed to social facilitation of feeding, (Hsia and Wood-Gush, 1984; Napolitano *et al.*, 2003; Wattanakul *et al.*, 2005). The variation among different research may relate to differences in management (e.g., the number of animals per group, milk volume provided, duration of the feeding period, and weaning method).

Housing should not have an impact on health. Most respiratory diseases are spread by airborne transmission, therefore pen type should not be expected to have an impact. Individually housed calves are still able to make oral and nasal contact through the partitions between pens, thus faecal-oral transmission is still possible for the spread of diarrhoea. However, some researchers have observed higher incidence of diarrhea and respiratory diseases for group-housed calves (Maatje *et al.*, 1993) [7]. The difficulties of early disease findings in group housed calves is thought to be the reason (Svensson and Liberg, 2006) [8]. However, it is believed that calf immunity, in conjunction with good hygiene, ventilation and adequate feeding, will have more of an impact on susceptibility to disease than housing type (Chua *et al.*, 2002) [3].

So, present study was formulated to study the effect of a social interaction on calf performance and health. We assumed that because of the effects of social facilitation, group and pair-housed calves would eat more solid feed and gain more weight during the milk-feeding period.

### 2. Materials and Methods

#### 2.1 Location of experimental site

This study was conducted at Livestock Research Center, National Dairy Research Institute, Karnal, India which is situated on 29° 42' N latitude and 72° 02' longitude at an altitude of 250 meters above the mean sea level in the bed of Indo - Gangetic alluvial plain. A subtropical climate prevails in this area, minimum temperature falls to around 4 °C in winter and maximum 45 °C in summer season. The annual rainfall is about 70cm; the relative humidity varies from 41 to 85 percent and vapor pressure ranges from 7.0 to 25.0mm Hg. There are four

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major seasons in the year viz. winter (December to March), summer (April to June), rainy (July to September) and autumn (October to November). The experiment was carried out for eight months from September 2018 to April 2019.

## 2.2 Animal selection and grouping

Six days old Sahiwal calves (n=24) free from any type of anatomical, physiological or infectious disorders were selected from NDRI Sahiwal herd. Calves were separated from their dam immediately after birth and kept in controlled calf shed. At 6<sup>th</sup> days of life, they were put into two group's i.e. group 1 having 16 animals housed individually in separate pens without any tactile and visual contact but only auditory contact was possible with other calves and group 2 having 8 calves which were housed in group. After 6 weeks of age, 3<sup>rd</sup> group was formed i.e. late pair housed (group 3 containing 4 pairs) by shifting the individual housed calves (n=8) in pair pen.

## 2.3 Growth Performance of the calves

Calves were offered daily measured amount of milk, concentrate and green fodder and the residual quantity was measured, by using electronic weighing balance. Later on actual intake was calculated by subtracting the residual quantity from the offered quantity. So, total intake could be calculated by

**Total intake (Kg/day)** = (Offered quantity of concentrate-residual quantity of concentrate) + (Offered quantity of green fodder-residual quantity of green fodder) + (Offered quantity of milk- residual quantity of milk)

Body weight of experimental calves were recorded initially at day of housing and then followed at weekly interval till the end of the experiment. Body weight of each calf was measured early in the morning before providing the animals any feed or water, using an electronic weighing scale. Average daily gain was also calculated by subtracting the previous week body weight from current body weight on day of measurement divided by number of days in between.

$$\text{Average Daily Gain(grams)} = \frac{W_2 - W_1}{\text{Number of days}}$$

## 2.4 Health Performance of the calves

Calves were checked for any ailment before putting them in the experiment, only healthy calves were selected. During the experimental period, routine health management (deworming, vaccination) of the calves was followed. In routine inspection, if any animal was found sick it was immediately taken to Animal Health Complex of the Institute for treatment. Percentage of animals affected with calf scours, respiratory disease and other diseases like alopecia, naval ill, joint ill, etc. were recorded in each group during the experiment.

## 2.5 Statistical analysis

The mean of the treatment group was subjected to statistical analysis as outlined by Snedecor and Cochran (1994). Difference of significance in variables among three groups was compared with the help of one way analysis of variance (ANOVA) in SPSS computer software version 21.

## 3. Result

### 3.1. Growth performance of calves

Daily dry matter intake (kg), weekly body weight and average

daily gain of the calves are promulgated in table 1. It was observed that it did not differ significantly among the groups.

**Table1:** Total Dry Matter intake (Mean ±SE) and Average Daily Gain (Mean ±SE) in calves of different treatment

Variable	Individual	Group	Late pair	P value
<b>TDMI/day</b>	<b>0.72 ± 0.05</b>	<b>0.78 ± 0.03</b>	<b>0.76 ± 0.03</b>	<b>0.118</b>
<b>Weekly ADG (kg)</b>				
1	0.114±0.62	0.287±0.49	0.126±1.14	0.259
2	0.441±0.30	0.214±0.35	0.360±0.49	0.002
3	0.324±0.34	0.302±0.59	0.269±0.46	0.723
4	0.256±0.75	0.400±0.64	0.309±0.76	0.382
5	0.487±0.54	0.407±0.28	0.387±0.38	0.224
6	0.402±0.69	0.302±0.35	0.460±0.36	0.096
7	0.447±0.67	0.449±0.71	0.475±0.53	0.943
8	0.508±0.62	0.467±0.33	0.462±0.49	0.775
9	0.482±0.59	0.434±0.51	0.444±0.59	0.820
10	0.557±0.54	0.508±0.68	0.406±0.43	0.183
11	0.461±0.54	0.551±0.58	0.434±0.57	0.327
12	0.516±0.48	0.539±0.49	0.665±0.60	0.124
13	0.466±0.50	0.558±0.53	0.592±0.56	0.246
Overall	0.420±0.18	0.417±0.17	0.415±0.20	

### 3.2. Effect of social interaction on health of calves

The results of health parameters are presented in table 2. The results showed that the percentage of calf scour was more in group followed by late pair and individually housed calves. The respiratory infection was also found to be more among the group housed calves followed by late paired calves. Whereas, none of the individually housed calves was affected with respiratory infections. The occurrence of other illness was more in group housed calves and no case was reported in individual and late pair housed calves. Overall percentage of occurrence of illness was more in group housed followed by late pair and individual.

**Table 2:** Percentage of occurrence of various disease among calves of different treatment

Treatment	Calf Scour		Respiratory Infection		Occurrence of other disease		Total number of inflection
	N	%	N	%	N	%	
Individual	9	29.03	0	0	0	0	9
Group	12	38.71	2	66.67	0	0	14
Late Pair	10	32.25	1	33.33	0	0	11
Total	31	100	3	100	0	0	35

## 4. Discussion

Daily dry matter intake (kg) by the calves was observed it did not differ significantly between the groups. It might be due to enough feed was provided to the calves in each groups to avoid competition. Similar to the present study Bolt *et al.* (2017) [2] also did not find any difference in feed intake and average daily gain in individual housed, pair housed at day 5 and pair housed at day 28. However, Vieira *et al.* (2010) [10] and Warnick *et al.* (1977) [11] reported significantly ( $p < 0.05$ ) higher feed intake in group reared animals. Contrary to this Maatje *et al.* (1993) [7] observed reduced feed intake in group housed calves and explained that this might be due to competition for feed. These variations might be due to difference in the management practices followed during the experiment. However, Average Daily Gain (ADG) showed that individually housed calves had higher ADG followed by group and late pair, but it did not vary significantly among the groups. The result of present study is in line with Bolt *et al.* (2017) [2]. However, diverse findings have also been reported

by many workers. Maatje *et al.* (1993)<sup>[7]</sup> found reduced feed intake and lower body weight gain in group housed calves and it explained that this might be due to the competition for feed among the calves whereas, Vieira *et al.* (2010)<sup>[10]</sup> and Warnick *et al.* (1977)<sup>[11]</sup> found no significant difference in weight gain. In contrast to present study, Bernal-Rigoli *et al.* (2012)<sup>[1]</sup>; Costa *et al.* (2015)<sup>[4]</sup>; Jensen *et al.* (2015)<sup>[6]</sup> and Tapki (2007)<sup>[9]</sup> reported higher weight gain and feed intake in group housed animals. These variations might be due to experimental methodology or management practices followed by different researchers. However, illness was slightly more in group housed but it can possibly be reduced by better management.

## 5. Conclusions

The present study on dairy calves has shown that there was no significant difference in dry matter intake and average daily gain among the groups. Cases of illness were slightly higher in group housed calves.

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