



## Short communication

## Influence of stocking density on weight gain and behavior of feedlot lambs



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## ABSTRACT

The aim of this study was to verify the influence of the animal density on the weight gain and behavior of confined lambs. 86 animals were confined after weaning in 23 pens of two lambs each (double pens) and four pens of ten animals each (collective pens). During the 80 days of confinement all lambs received the same diet and the animals were weighed at the beginning of the trial and every 14 days for the control of the weight gain. The behavioral patterns were recorded by focal sampling method using a time sampling of 30 minutes, from 6:00 am to 6:00 pm, for 4 days. The behavioral variables were: posture (standing; lying), activity (eating; ruminating; leisure; drinking water; grooming) and events (nid-nodding; pushing; picking up; bellowing; mounting; defecating; urinating). For the evaluation of the weight gain and behavior of the animals an analysis of variance and multiple comparison procedure by Student t test was used. The average weight gain was higher for pen animals (0.228 kg/day) compared to the animals housed in the collective pens (0.208 kg/day;  $P=0.07$ ). A higher percentage of animals housed in double pens remained standing compared to the animals housed in collective pens at 8:30 am ( $P<0.05$ ), 11:30 am ( $P<0.01$ ), 2:30 pm ( $P<0.01$ ), 4:30 pm ( $P<0.01$ ), and 5:30 pm ( $P<0.01$ ). For the eating activity, it was observed that 6.9% more animals kept in the double pens remained in this activity at 8:30 am ( $P<0.05$ ) and 4:30 pm ( $P<0.05$ ), than in collective pen. No statistical difference was found for the other activities and events between treatments. The number of animals per group influenced the behavior of confined lambs, changing the pattern of food intake which could improve the weight gain.

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## 1. Introduction

When considering the high costs of land, the confinement of sheep is a strategy capable of satisfying both the

producer and the consumer, since it reduces the production cycle and makes young animals and carcasses available to the market, consequently, products of better quality (Urano et al., 2006) meeting the market requirements for lamb.

The sheep and the cattle are gregarious animals – that is, living in groups – and this seems to be so important that individuals isolated from the herd become stressed. Although the group life brings a number of adaptive advantages such as: making it easier to find a sexual

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<u>Category 1</u>	
<u>Posture</u>	
1.	Laying down (sternal or lateral decumbency)
2.	Standing (Supported on its members, stopped or displacement)
<u>Category 2</u>	
<u>Activities</u>	
a.	Eating (taking in food with their mouths in the trough)
b.	Ruminating (chewing movements without eating, standing or lying down)
c.	Idling (no apparent activity, standing or lying down)
d.	Drinking Water (Drinking water from the fountain)
e.	Grooming (scratching or licking himself or another animal)
<u>Events</u>	
f.	Nid-nodding (hitting another with his head)
g.	Pushing (away from another animal with the body)
h.	Picking up (being attacked by another animal)
i.	Bellowing (mooing)
j.	Mounting (climbing on the back or rump of another animal)
k.	Defecating (eliminating feces)
l.	Urinating (in urination)

**Fig. 1.** Working ethogram used during the confinement.

partner and better defense against predators, it also brings increased competition for resources, especially when it is scarce, resulting in the presentation of aggressive interactions among animals of the same group or herd (Paranhos da Costa and Nascimento, 1986; Penning et al., 1993; Dumont and Boissy, 2000).

It is known that when animals are fed in groups, the social facilitation results in a higher feed intake reducing the growth rate variation in the group and better social behavior compared to animals that are fed individually (Titto et al., 2010; O'connell et al., 2004; Odoi and Owen, 1993). Social relationships are important to help the animals deal with its environment, as social partners influence individual reactions to external events (Veissier et al., 1998).

However, when group size becomes too large, the competition, aggression and stress may lead to reduced growth and weight gain (Barnett et al., 1983; Tan et al., 1991; O'connell et al., 2004). It can also be found when the area is too large that animals need to increase energy expenditure required for the movement to access feeding and watering (Turner et al., 2000).

Young animals when housed in pairs spend around 2% of the day in social contact and the incidence of agonistic behavior is reduced (Chua et al., 2002). However, the incidence of aggressive behavior increased as the number of lambs in the stalls increased (Van et al., 2007).

In adult animals, the number of agonistic interactions increased linearly as the group size increased (Kondo et al., 1989). In conditions of high population density, animals cannot avoid a violation of their individual space, which can result in increased agonistic interactions and social stress (Schake and Riggs, 1970; Kondo et al., 1989; Paranhos da Costa and Costa e Silva, 2007).

The difference between young and adult animals in the development of a dominant position in the youth groups is relatively more obscure than in the mature groups (Schake and Riggs, 1970).

When groups are very large, animals may have difficulty in recognizing each partner and memorizing the

social status of all of them, which would also increase the incidence of aggressive interactions (Hurnik, 1982). As a result, animals kept in large groups with high density have reduced individual performance (Czako, 1983) and exhibit behavioral abnormalities (Paranhos da Costa and Costa e Silva, 2007).

The aim of this study was to verify the influence of animal density on the behavior and performance of confined lambs.

## 2. Materials and methods

The data for this study was collected in the Southeast Livestock Research Center, in the Brazilian Agricultural Research Corporation (EMBRAPA), under the Ministry of Agriculture, Livestock and Supply, localized at 21°58'10" S, 47°51'04" W, 890 m of altitude, in the city of São Carlos, Brazil. Behavior and productive data were collected on 86 male crossbred Santa Ines lambs, with 90(±6) days and 20(±2.3) kg of live weight. They were bred in rotational grazing system with concentrate supplementation in creep-feeding.

Animals were divided into two major groups; one housed in 23 pens with two lambs in each, and other in four collective pens with 10 animals in each. The pens had short walls (1.65 m) dividing the area, concrete floor and covered with ceramic tiles and ceiling height of 3 meters and bedded with woodchips. The pens for two lambs had an area of 4.8 m<sup>2</sup> and the collective pen had an area of 24 m<sup>2</sup>.

All lambs received the same diet during the feedlot period containing 30% corn silage and 70% concentrate composed primarily of corn, soy-bean meal and mineral mix, fed daily at 8:00 am and 4:00 pm, and had free access to water. The confinement lasted 80 days with 14 days of adaptation. The animals were weighed at the beginning of the trial and every 14 days for controlling the weight gain.

During the period in the feedlot, behaviors were recorded according to the methodology proposed by Martin and Bateson (1986), by instantaneous and continuous sampling, using the focal sampling method and sampling intervals of 30 min in a direct fashion, with continuous periods of 12 h from 6:00 am to 6:00 pm for 4 days. The behavioral variables were: posture (standing or lying), activity (eating, ruminating, idling, drinking water and grooming) and events (nod-nodding, pushing, picking up, bellowing, mounting, defecating, urinating), as shown in the working ethogram in Fig. 1.

For bioclimatic data, black globe temperature, maximum and minimum temperatures and relative humidity were recorded from inside the feedlot.

The air temperatures, relative humidity and black globe temperature inside the facility during the experiment period are presented in Table 1.

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