IMPACT OF INDIVIDUAL PENS REMOVAL ON VEAL CALVES' BEHAVIOR AND PERFORMANCES

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I. INTRODUCTION

France is the world's largest consumer of veal (3.2 kg carcass weight equivalent per capita) and the second largest producer (with 1.2 million calves slaughtered) [1]. Veal calf production in France is organised around specialised fattening farms, mostly in closed facilities with dynamic ventilation. This type of production is organised per batch, with all calves (from dairy farms) arriving at the same time in the fattening facility at an average age of about 20 days. In most farms, and mainly for sanitary reasons, the calves are housed for the first 4 weeks in individual pens, until they are maximum 8 weeks old, and then in collective pens [2]. Throughout their fattening period, they are fed with milk and solid feed (a mixture of cereals, proteins and fibre) until they leave for the slaughterhouse (after about 5.5 months of fattening). In a context of structurally decreasing volumes produced and consumed, the veal industry must face up to new societal expectations and to a potential change in regulations concerning housing conditions in order to improve the welfare of calves (e.g., the start-up phase of calves in individual pen is being re-considered) [3]. In this context, a trial was conducted to study the impact of individual pen removal in veal calf production the first 4 weeks.

II. MATERIALS AND METHODS

A total of 80 male Prim Holstein calves aged 20 days and weighing 49.0 kg were batched according to their age and weight into 4 batches and housed for the first 28 days in individual pens (control, IP28), or by pair (pair housing, PH28), the first 14 days in individual pens (IP14) or in groups of 5 calves at arrival (GROUP). This trial was conducted at the French Livestock Institute's experimental farm for veal calves (Brittany, France). The calves from IP28, IP14 and PH28 were then fattened in collective pen of 5 calves. The total fattening period last 24 weeks. Drinking milk from buckets in collective pens requires the presence of headlocks that were closed for 30 minutes maximum to allow individual monitoring of milk consumption. The calves of all 4 batches were fed the same feeding plan composed of 286 kg of milk replacer and 220 kg of solid feed. The milk was distributed twice a day (at 7:45 am and 5:45 pm). The solid feed was then distributed in collective troughs by group of 5 calves. The health protocol was identical for all calves (vaccination on arrival against RS-BVD and ringworm, as well as an anti-lice treatment). Calves were weighed every 28 days. Individual milk consumption was measured, as well as collective solid consumption per pen. All sanitary treatments were recorded individually. Regarding calves' activities, scans sampling observations on a 5 minutes time step were carried out from 6 am to 8 pm on 4 days, complemented by continuous sampling observations (D13, D27, D112 and D156). Pedometers were placed on one of the back leg on 4 calves per batch for 48 days around the 4 days of observations. They were used to measure the lying/standing position and the number of steps taken by the animals. Significance differences ($P<0.05$) among samples were determined by analysis of variance (ANOVA) using the Least Square Difference method of the General Linear Model procedure of R (R project 4.2.3).

III. RESULTS AND DISCUSSION

The use of headlocks for PH28 and GROUP the first days resulted in more agitated retreating behaviour of the calves (35% of calves in the first two days and 20.7% at 2 weeks) while the headlocks were not used during drinking at the start-up phase for IP28 and IP14 housed in individual pens. At D13, prepuce-sucking was more frequent in PH28 and GROUP (8.2% and 11.1% of their daytime *vs* 0.4% for IP28

and 0.3% for IP14, P<0.01). 65% of this activity occurred 1.5 hours before and after milk drinking (Fig. 1). At D27, this prepuce-sucking behavior was still very present for PH28 (3.2% of their daytime, with 65% calves affected compared to 0 % for IP28 and IP14, P<0.01 and 1.6% for GROUP being with 56% of calves affected, NS). 2 calves in GROUP batch with high prepuce-sucking behavior had to be isolated (at D54 and D133) because they were no longer drinking their milk and were losing weight.

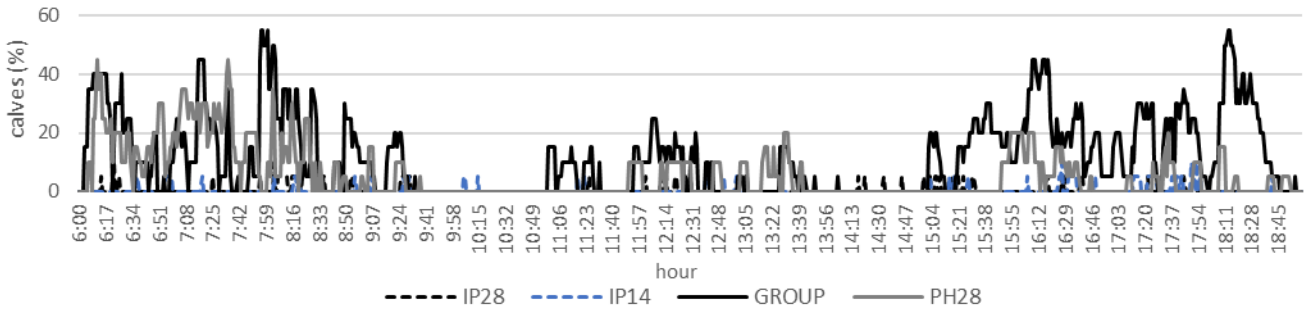

Figure 1. Proportion of calves with prepuce-sucking behaviour per batch at D13

Positive interactions such as grooming were equivalent between the 4 batches (representing 1.3% of the day's activities). Nevertheless, IP28 and IP14 spent more time expressing PICA behavior (sucking or licking non nutritve object) on D13 (7.8% *vs* 1.5% for PH28 and GROUP, P<0.01). These differences are balanced out during the rest of the fattening period. Furthermore, no significant differences were observed on the number of health treatments per batch for respiratory problems or on live weight at slaughter, despite 10 kg difference between IP28 *vs* IP14, PH28 and GROUP (Table 1). IP28 had better conformation with less carcasses scored P (16% *vs* 37% for IP14, 32% for PH28 and 35% for GROUP).

Table 1. Calves' health and performance by batch

Criteria	IP28		IP14		PH28		GROUP		P-value
	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM	
Respiratory health treatments (nbr)	1.68	0.20	1.68	0.20	1.74	0.17	1.80	0.19	0.97
Growth (g/d)	1292	33	1231	42	1233	35	1231	35	0.53
Live weight at slaughter (kg)	262.7	5.8	252.2	7.2	252.5	5.6	251.9	6.0	0.51
Cold carcass weight (kg)	142.6	3.2	137.6	4.0	139.5	3.4	135.3	4.3	0.57
Carcass output (%)	54.3^{ab}	2.7	54.6^{ab}	2.6	55.2^{b}	3.5	53.5^{a}	6.9	0.06

IV. CONCLUSION

These results show that fattening male calves in individual pens leads to the development of PICA behaviour but does not alter their growth. Housed in pairs or in groups from the first week of fattening results in an increase in prepuce-sucking behaviour which leads to a loss of appetite and a loss of weight.

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