

Impact of Piglet Birth Weight on Growout Performance and Carcass Quality

J.F. Patience, A.D. Beaulieu and T. Osmanagic

SUMMARY

Increased litter size resulted in decreased average birth weight, but had no effect on body weight variability at birth or later in life. Carcass quality was unaffected by litter size.

INTRODUCTION

Muscles contain primary and secondary fibres. One consequence of reduced birth weight are changes in the proportions of these fibre types in the muscles. The effect of this on the adult muscle composition and subsequent eating quality of the meat is not known. Increased litter size results in a reduced mean birth weight. Recent analysis (Patience, unpublished data) showed that increasing litter size by 1 pig, reduced average birth weight by 100g and doubled the proportion of piglets with a birth weight below 800g.

The objective of this experiment was to determine if there is a relationship among birth weight and post-weaning growth performance on carcass quality, muscle histology and subsequent eating quality. Secondly, we wanted to determine if increased litter size was associated with increased variability of piglet weight at birth and during later life. The muscle histology and eating quality results will be presented in a later report.

MATERIALS AND METHODS

All farrowings were attended during a 5 week period at PSC Elstow. At the time of farrowing, each live-borne piglet was identified individually, weighed and then re-weighed on the day of weaning, 5 weeks post-weaning, at nursery exit, at first pull, and at the time of marketing. The number of mummies and stillborn piglets were also recorded, but not weighed and not included in the birth order. Management followed normal barn protocols.



RESULTS AND DISCUSSION

Litter size. Data was collected from 98 litters and 1,114 piglets (Table 1). Litters were divided into "small" (3 to 10 piglets born alive), "medium" (11 to 13 born alive) and "large", (14 to 19 born alive). Interestingly, 91% of the total born were born alive in the small and medium groups, while greater than 98 % of those born in the large litters were born alive. The proportion of pigs weaned of those born alive was about 85% for all groups.

'Increased litter size resulted in decreased average birth weight, but had no effect on body weight variability at birth.'

Average birth weight was 1.59, 1.41 and 1.35 kg for the small, medium and large groups, respectively (Table 1). The standard deviation (SD) of birth weight was very similar between groups, 0.30 to 0.32 kg, and therefore the coefficient of variation (CV=SD/mean * 100) was slightly less for the large litters.

Weaning weights. Average weaning weight was 6.55 kg, and ranged from 1.55 kg to 10.7 kg. The average SD for weaning weight was 1.45 kg, which is similar to the SD for the "large" litter group. The SD for the "small" litter groups was slightly higher, 1.59, and therefore the CV for weaning weight was similar among groups. The 5 and 7 week weights show a similar trend. Average weights were similar between groups, and the SD was actually slightly lower for the "large" litter groups, resulting in a similar CV between groups.

Market Data. Dressing weight was approximately 94.30 kg, and was similar between litter size groups, as was the SD and therefore the CV (Table 2). The lean yield, loin area, and mm of fat varied more within a litter group than between.

CONCLUSIONS

As expected, increased litter size, results in decreased average birth weight, however, it was surprising to observe that larger litters does not result in increased variability in body weight at birth.

ACKNOWLEDGEMENTS

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork Council and Saskatchewan Agriculture and Food Development Fund. Specific funding for this project from the Alberta Industry Livestock Development Fund Ltd and PIC are gratefully acknowledged.

Table 1. The effect of litter size on the growth and variability of growth

	Small 1/3 of litters	Medium 1/3 of litters	Large 1/3 of litters	All Litters
Litter n	38	39	21	98
-----TOTAL BORN ALIVE, n-----				
Mean	8.37	12.10	15.43	11.37
StDev	1.75	0.85	1.50	3.04
Min	3.00	11.00	14.00	3.00
Max	10.00	13.00	19.00	19.00
CV, %	20.91	7.02	9.72	26.74
-----TOTAL WEANED, n-----				
Mean	7.29	10.31	12.86	9.68
StDev	1.99	1.66	3.17	3.04
Min	2.00	5.00	2.00	2.00
Max	10.00	13.00	17.00	17.00
CV, %	27.30	15.42	24.63	31.44
-----d0 BODY WEIGHT, kg-----				
Mean	1.59	1.41	1.35	1.44
StDev	0.32	0.30	0.32	0.33
Min	0.80	0.75	0.75	0.75
Max	2.50	2.50	2.35	2.50
CV, %	20.13	21.27	23.76	22.61
-----WEANING WEIGHT, kg-----				
Mean	6.78	6.43	6.47	6.55
StDev	1.59	1.33	1.45	1.45
Min	1.55	2.00	2.05	1.55
Max	10.70	9.75	10.10	10.70
CV, %	23.45	20.67	22.39	22.11
-----5 WK WEIGHTS, kg-----				
Mean	22.73	21.98	22.66	22.39
StDev	4.11	3.44	3.65	3.72
Min	8.30	11.35	7.75	7.75
Max	33.50	30.05	31.85	33.50
CV, %	18.09	15.66	16.11	16.60
-----7 WK WEIGHTS, kg-----				
Mean	32.57	31.67	32.88	32.28
StDev	5.00	4.28	4.63	4.62
Min	11.90	18.75	14.50	11.90
Max	44.40	43.85	44.90	44.90
CV, %	15.36	13.50	14.10	14.33
-----1st PULL WEIGHTS, kg-----				
Mean	97.66	97.42	98.7	97.93
StDev	10.73	9.98	10.50	10.40
Min	59.9	65.8	63.7	63,13
Max	122.4	118.4	122.2	121.0
CV, %	10.98	10.25	10.64	10.62

Table 2. The effect of litter size on carcass quality

	Small 1/3 of litters	Med 1/3 of litters	Large 1/3 of litters	All Litters
# OF PIGS	222	222	199	
-----DRESSING WT, kg-----				
Mean, kg	94.39	94.30	94.42	94.36
StDev, kg	3.56	4.21	3.63	3.86
Min, kg	79.90	75.60	74.30	74.30
Max, kg	79.90	107.20	104.20	107.20
CV, %	3.77	4.47	3.84	4.09
-----YIELD, %-----				
Mean	60.40	60.54	60.16	60.39
StDev	1.84	2.03	1.99	1.96
Min	55.10	55.20	54.90	54.90
Max	64.70	65.40	65.00	65.40
CV	3.04	3.35	3.30	3.25
-----LOIN, mm-----				
Mean, mm	66.41	67.11	66.42	66.70
StDev, mm	5.84	6.67	7.25	6.60
Min, mm	46.00	44.00	34.00	34.00
Max, mm	78.00	81.00	79.50	81.00
CV, %	8.80	9.94	10.91	9.89
-----FAT, mm-----				
Mean, mm	19.74	19.56	20.28	19.82
StDev, mm	4.24	4.74	4.48	4.52
Min, mm	11.00	10.00	11.00	10.00
Max, mm	36.00	35.00	32.50	36.00
CV, %	21.27	24.25	22.07	22.82
-----INDEX-----				
Mean	109.30	108.90	108.62	108.95
StDev	6.41	7.02	7.57	6.99
Min	50.00	50.00	50.00	50.00
Max	113.00	113.00	113.00	113.00
CV, %	5.86	6.45	6.97	6.42