



*Original Research*

## Effect of Split up Suckling on the Growth Performance, Survivability and Economics of Large White Yorkshire Piglets

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Rec. Date:	Jul 09, 2018 06:55
Accept Date:	Nov 16, 2018 15:49
DOI	<a href="https://doi.org/10.5455/ijlr.20180709065521">10.5455/ijlr.20180709065521</a>

### Abstract

The study involved two groups such as treatment group (split up suckling) and control group (regular suckling) of 6 Large White Yorkshire sows with their litters, providing a total of 108 piglets. The piglets born to these pigs were categorised in to three units such as Category A- low birth weight (800 g - 1199 g), Category B - medium birth weight (1200 g - 1499g) and Category C -high birth weight (> 1500 g ) units based on the body weight. In the treatment group, piglets in Category A were allowed to suckle first and were followed by Category B and then piglets from Category C. The piglets born under the control group were freely allowed to suckle in a regular manner, without any intervention. This protocol was adopted 3 times every day till weaning. No significant difference was noticed in weight at 180 days, feed intake and feed efficiency between the groups. Statistical analysis revealed that the piglets under split-up suckling group had significantly ( $P \leq 0.01$ ) higher body weight gain and weaning weight than those piglets under regular suckling management. It was evident from the study that the system of split up suckling had better economic and health prospects than regular suckling systems.

**Key words:** Growth Performance, Large White Yorkshire Piglets, Regular Suckling, Split up Suckling

**How to cite:** Balakrishnan, R., Gnanaraj, P., Radhakrishnan, L., Thennarasu, A., & Rachel Jemimah, E. (2019). Effect of Split up Suckling on the Growth Performance, Survivability and Economics of Large White Yorkshire Piglets. International Journal of Livestock Research, 9(3), 103-111. doi: 10.5455/ijlr.20180709065521

### Introduction

The pig population in India is around 13.52 million constituting 2.79 percent of the total livestock population (2014) and in Tamil Nadu is 1.12 million. Within the livestock species, piggery is a significant source of meat production and the feed efficiency in conversion of meat is very effective next to broiler.



Exotic pigs are potential animal protein suppliers in developing country like India (Archana *et al.*, 2017). Pigs can thrive in diversified and intensive environments in our Indian climatic conditions. The resources and input requirements are very minimal for piggery development and management. Pig rearing is a profitable occupation, especially for small and marginal farmers and it requires minimum capital investment and labour. Piggery plays a major role and source of income for the livelihood of poor and downtrodden group of people in India. However, the significance of piglet survival at birth and through the pre-weaning period is a deciding factor in the assessment of sow productivity (Anne and Rushen, 1989). On an average, 20 to 25% of all piglets farrowed die before weaning. Numerous studies have tried to identify the predisposing factors and basic causes of individual deaths. The highest pig mortality rate occurs between birth and weaning, with up to 80 percent of these deaths occurring during the first week of life. Factors such as long birth intervals, long latencies to first suckle, low birth weights, late births within the litter, failure in fights and suckling during the first hours after birth have been found to be associated with weaknesses and low viability (Milligon *et al.*, 2001).

Therefore, it is quite important that the weak, low birth weight piglets must be given importance to access the teats by manipulating interventions such as allowing them to suckle first in order to get the required milk for them and then allowing the normal and heavier weight piglets to suckle the remaining milk from mother subsequently, a phenomenon called split-up suckling of piglets. With the above said background, the present research work has been taken up with the following specific objective to evaluate the effect of split-up suckling on growth performance of Large White Yorkshire piglets.

## Materials and Methods

### Experimental Location

The experiment was carried out at TANUVAS University Research Farm, Madhavaram milk colony, Chennai- 51, located between latitudes 12° 9' and 13° 9' N and longitudes 80° 12' and 80° 19' E with an altitude of 22 m above MSL.

### Experimental Design

The study involved two groups of six Large White Yorkshire sows with their litters, providing a total of 108 piglets. As this experiment was designed to study the effect of split up suckling on the performance of weak and low birth weight piglets as compared to regular suckling, the trial was conducted in two distinct groups – Treatment group (split up suckling) and Control group (regular suckling).

Treatment Group			Control Group
6 pregnant sows (Split up suckling)			6 pregnant sows (regular suckling)
Litters born were classified into three categories as below			
The piglets from A were allowed to suckle initially followed by B and C. Thus the priority is given for weak piglets.			
Low birth weight	Medium birth weight piglets	High birth weight piglets	
Piglets	(1.2 to 1.4kg)	(above 1.5 kg)	
(0.8 to 1.1 kg)	(B)	(C)	
(A)			

### Treatment Group

In the treatment group, six sows in the age group of two to four years and with a mean body weight of 170-270 kg were selected. Pregnancy was confirmed before selecting them under the treatment group category. These six pregnant sows formed the treatment group and utilized for split up suckling. The piglets born under this group were further classified into three categories based on the birth weight as follows:

#### Category A

Piglets with a low birth weight - Those piglets with a body weight (at birth) ranging between 800 grams and 1199 grams. It was decided that if piglets were born with a birth weight below 800 grams, they would not be selected for the study.

#### Category B

Piglets with a medium birth weight - Those piglets with a body weight (at birth) ranging between 1200 grams and 1499 grams.

#### Category C

Piglets with a high birth weight - Those piglets with a body weight (at birth) above 1500 grams.

With due diligence, it was ensured that piglets in Category A, that is those piglets with a body weight (at birth) ranging between 800 grams to 1199 grams were allowed to suckle first to ensure the chances of survivability and to obtain maximum nourishment without competition from their heavier litter mates. The category A piglets were followed by Category B (piglets with a body weight between 1200 to 1499 grams) and then piglets from Category C (piglets with a body weight above 1500 grams) were allowed for suckling. This protocol was adopted mandatorily 3 times every day till the period of weaning. The piglets belonging to the three categories – A, B and C were reared in specially designed boxes inside the farrowing pen, ensuring that they maintained their identity throughout the experiment.

### **Control Group**

In the control group, six sows in the age group two to four years and with a mean body weight of 170-270 kg were selected. Pregnancy was confirmed before selecting them under the control group category. The piglets born under this group were freely allowed to suckle in a regular manner, without any intervention.

### **General Management Pattern**

All the animals were reared under similar standard management conditions except the changes incorporated in the suckling pattern. Standard health cover protocols were followed as per the farm guidelines in vogue.

### **Housing and Management**

Twelve farrowing pen with provision of farrowing crates were selected for accommodating pregnant sows. After weaning, the categorized piglets were reared in the fattener pig sty. The buildings were located in east – west orientation. The piglets were housed from the birth along with their sow until weaning. The piglets in group A, B, and C were separately maintained in three different boxes in order to suckle as per the protocol formulated till weaning. The same approach is followed for all the piglets in treatment groups. The piglets in control group were allowed to suckle freely without any interventions. Piglets were fed *ad libidum* water and creep feed from 21 days of age. Iron was administered as per requirement and needle tooth were clipped on the farrowing day. Sexing and ear notching were carried out within 24 hours of birth.

On the day of weaning, the sows were removed from piglets and kept in a separate pen. Weighing of piglets and tagging for identification were carried out on the day of weaning. After weaning, the piglets in both groups were provided with uniform standard weaner pig feed along with swill feed thereafter until slaughter. Deworming of piglets was carried out as per the norms and standards of the farm guidelines. Feeding and disease management were carried out as per the farm guidelines. All the pens were cleaned and disinfected on daily basis. All the bio-security measures were adopted to provide a safe environment to the animals.

### **Data Recording and Statistical Analysis**

#### **Birth Weight**

The piglets were weighed after farrowing using the electronic weighing balance to determine the birth weight in kilograms.

#### **Fortnightly Body Weight**

Piglets were weighed in the morning hours before feeding on fortnightly intervals from weaning to slaughter using a platform weighing balance to assess the body weight in kilograms.

### Weaning Weight

Piglets were weighed in the morning hours before feeding on the day of weaning using a platform weighing balance to assess the body weight in kilograms.

### Weight at 180 Days

Piglets were weighed in the morning hours before feeding at 180 day of age using a platform weighing balance to assess the body weight in kilograms.

### Feed Intake

The feed intake was assessed based on the daily feed intake from the date of weaning to the day 180 in kilograms.

### Feed Efficiency

Feed efficiency was calculated using the formula given by Banerjee (1998) as below-

$$\text{Feed efficiency} = \frac{\text{Feed consumed}}{\text{Body weight gain}}$$

### Survivability

Number of piglets in either group that survived the study duration was recorded. The collected data were statistically analysed using 't' test using SPSS17 software.

## Results and Discussion

### Birth Weight

The birth weight of Large White Yorkshire piglets under split up suckling (group II) and piglets under regular suckling (group I) without any interventions are presented in (Table 1).

**Table 1:** Mean  $\pm$ SE (Kg) of body weight of piglets from birth to 56 days of age

S. No.		Group I (Control)				Group II (Treatment)				F value
		LBW (n= 18)	MBW (n= 18)	HBW (n= 18)	Overall average body weight (n= 54)	LBW (n= 18)	MBW (n= 18)	HBW (n= 18)	Overall average body weight (n= 54)	
1	Birth weight (kg)	1.08 $\pm$ 0.02	1.36 $\pm$ 0.016	1.62 $\pm$ 0.018	1.36 $\pm$ 0.09	1.07 $\pm$ 0.02038	1.37 $\pm$ 0.014	1.64 $\pm$ 0.015	1.37 $\pm$ 0.07	170.530 <sup>NS</sup>
2	I Fortnight Body Weight (kg)	1.89 $\pm$ 0.04 <sup>e</sup>	2.03 $\pm$ 0.02 <sup>de</sup>	2.36 $\pm$ 0.04 <sup>c</sup>	2.10 $\pm$ 0.07 <sup>d</sup>	2.06 $\pm$ 0.05 <sup>d</sup>	2.84 $\pm$ 0.03 <sup>a</sup>	2.75 $\pm$ 0.04 <sup>a</sup>	2.55 $\pm$ 0.09 <sup>b</sup>	23.71 <sup>**</sup>
3	II Fortnight Body Weight (kg)	3.40 $\pm$ 0.04 <sup>c</sup>	3.54 $\pm$ 0.02 <sup>c</sup>	3.87 $\pm$ 0.04 <sup>a</sup>	3.61 $\pm$ 0.07 <sup>b</sup>	3.57 $\pm$ 0.05 <sup>b</sup>	3.65 $\pm$ 0.03 <sup>b</sup>	3.93 $\pm$ 0.03 <sup>a</sup>	3.72 $\pm$ 0.07 <sup>b</sup>	32.27 <sup>**</sup>
4	III Fortnight Body Weight (kg)	5.85 $\pm$ 0.04 <sup>d</sup>	5.59 $\pm$ 0.02 <sup>e</sup>	6.32 $\pm$ 0.04 <sup>b</sup>	6.06 $\pm$ 0.07 <sup>c</sup>	6.02 $\pm$ 0.050 <sup>c</sup>	5.80 $\pm$ 0.03 <sup>d</sup>	6.58 $\pm$ 0.03 <sup>a</sup>	6.13 $\pm$ 0.07 <sup>c</sup>	32.27 <sup>**</sup>
5	56 days Weaning Weight (kg)	7.20 $\pm$ 0.13 <sup>c</sup>	7.51 $\pm$ 0.10 <sup>b</sup>	7.24 $\pm$ 0.12 <sup>c</sup>	7.32 $\pm$ 0.10 <sup>c</sup>	7.73 $\pm$ 0.05 <sup>a</sup>	7.75 $\pm$ 0.04 <sup>a</sup>	7.75 $\pm$ 0.06 <sup>a</sup>	7.74 $\pm$ 0.07 <sup>a</sup>	7.280 <sup>**</sup>

F Value \*\* - Highly significant ( $P \leq 0.01$ ); LBW: Low birth weight piglets; MBW: Medium birth weight piglets; HBW: High birth weight piglets. Note: Means within a row having different superscripts differ significantly ( $P < 0.01$ )

Statistical analysis revealed no significant difference between the groups. This is in accordance with findings of Quiniou *et al.* (2002) who observed that the uniformity in birth weight in the selected categories.

### **Fortnightly Body Weight**

#### **Body Weight during the First Fortnight**

The first fortnight body weight of Large White Yorkshire piglets under split up suckling (group II) and piglets under regular suckling (group I) without any interventions are presented in (Table 1). It was observed that the first fortnight body weight was significantly higher in treatment group than the control groups. The comparatively better performance shall be attributed to the better nourishment opportunities provided to the weak and low birth weight piglets in the treatment group than the control group piglets. This was in agreement with the findings of Donovan and Steve (2000) who observed that that split nursing decreased the variation in average daily gain of piglets from birth to weaning.

#### **Body Weight during Second Fortnight**

The second fortnight body weight of Large White Yorkshire piglets under split up suckling (group II) and piglets under regular suckling (group I) without any interventions are presented in (Table 1). It was observed that second fortnight body weight was significantly higher in treatment group than the control groups indicating the better performance of split up suckled piglets. This was in agreement with the findings of Gomeze *et al.* (2009).

#### **Body Weight during Third Fortnight**

The third fortnight body weight of Large White Yorkshire piglets under split up suckling (group II) and piglets under regular suckling (group I) without any interventions are presented in (Table 1). The third fortnight body weight was significantly higher in treatment group than the control groups indicating the better performance of split up suckled piglets. This was in accordance with the findings of Kuller *et al* (2007).

### **Weaning Weight**

The weaning weight of Large White Yorkshire piglets under split up suckling (group II) and piglets under regular suckling (group I) without any interventions are presented in (Table 1). Result revealed that significantly ( $P \leq 0.01$ ) higher weaning weight in treatment group than the control group. This might be due to special attention in providing more access to the weak and low birth weight piglets to get the sufficient quantum of milk without any competition for the teats that enhanced the piglets grow well to attain a better weaning weight in the treatment group than the control group. This was in accordance with the findings of

Donovon and Steve (2000) who observed that split nursing to be effective to attain a better weaning weight than the regular suckling group piglets.

### Weight at 180 Days

The weight at 180 days of Large White Yorkshire piglets under split up suckling (group II) and piglets under regular suckling (group I) without any interventions are presented in (Table 2). Statistical analysis revealed that weight at 180 days remained the same both under split-up suckling and regular suckling. This was in accordance with the findings of Markku *et al.* (2004).

### Feed Intake

The feed intake remained the same both under split-up suckling and regular suckling. The feed intake of Large White Yorkshire piglets under split up suckling (group II) and piglets under regular suckling (group I) without any interventions are presented in Table 2. This was in accordance with Markku *et al.* (2004) studies.

**Table 2:** Mean  $\pm$ SE (Kg) of feed intake and feed efficiency of Large White Yorkshire piglets

S. No.	Group I (Control)			Group II (Treatment)			F VALUE	
	LBW (n= 18)	MBW (n= 18)	HBW (n= 18)	LBW (n= 18)	MBW (n= 18)	HBW (n= 18)		
1	<b>Weight at 180 days (kg)</b>	57.91 $\pm$ 0.02	58.16 $\pm$ 0.34	57.73 $\pm$ 0.33	58.15 $\pm$ 0.34	57.90 $\pm$ 0.34	58.42 $\pm$ 0.34	0.842 <sup>NS</sup>
2	<b>Feed intake (kg)</b>	155.81 $\pm$ 3.54	156.93 $\pm$ 3.54	161.90 $\pm$ 3.76	156.59 $\pm$ 3.54	155.84 $\pm$ 3.54	156.99 $\pm$ 3.54	0.771 <sup>NS</sup>
3	<b>Feed efficiency</b>	2.69 $\pm$ 0.61	2.69 $\pm$ 0.61	2.80 $\pm$ 0.06	2.06 $\pm$ 0.05	2.69 $\pm$ 0.61	2.68 $\pm$ 0.06	0.739 <sup>NS</sup>

F value<sup>NS</sup>– Non significant ( $P > 0.05$ ); LBW: Low birth weight piglets; MBW: Medium birth weight piglets; HBW: High birth weight piglets

### Feed Efficiency

The feed efficiency of Large White Yorkshire piglets under split up suckling (group II) and piglets under regular suckling (group I) without any interventions are presented in (Table 2). Statistical analysis revealed that there was no significant difference in feed efficiency between the groups. This is in accordance with Markku *et al.* (2004) studies. There was no significant dissimilarity in the overall feed intake among the groups.

### Survivability

The survivability study in the trial revealed no mortality among the groups. This might be attributed to the scientific and effective managerial practices adopted with all the professional care.

## Economics

The cost of production on feed basis revealed that the pigs under split-up suckling were slightly better and cheaper than regular suckling method. Under split-up suckling method, the cost of production was comparatively lower (Rs 44.38) than regular suckling method (Rs 45.04).

**Table 3:** Cost of production of pigs under two different suckling groups

Group	Split-up Suckling	Regular Suckling
No. of piglets	108	108
Total initial body weight (kg)	112.06	99.09
Total final body weight (kg)	3128.67	3140.64
Total weight gain (kg)	3046.61	3041.55
Total feed intake	8449.83	8543.76
Total feed cost	139422.195	140972.04
Cost of feed per kg	16.5	16.5
Feed conversion ratio	2.69	2.73
Cost of production (on feed basis) (FCR x COST of feed/kg)	44.385	45.045

It was evident from the study that the system of split up suckling had a better economic and health prospects than regular suckling systems in terms of fortnightly and weaning weight gain and economics of pig rearing.

## Conclusion

The following conclusions are drawn from the findings of above study-

- 1) The piglets under split up suckling system had a significantly higher fortnightly body weight and higher weaning weight.
- 2) Loss of piglets due to crushing, competition for teats during suckling was prevented.
- 3) Raising piglets especially low birth weight under split up suckling shall be considered as viable option for the practicing commercial pig farmers.

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