

# Effects of afternoon or morning weaning protocol on pig growth performance

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## Summary

**Objective:** To evaluate the effects on nursery pig growth performance when sows are withdrawn either the afternoon before their pigs move to the nursery or the morning when the pigs move to the nursery.

**Materials and methods:** A total of 542 weanling pigs (PIC L327 × L42) from 50 litters were used in the experiment. Each sow and litter was randomly allotted to a weaning protocol. For half of the litters, the sow was removed on Thursday afternoon, leaving the pigs in the farrowing crate until the following morning

(afternoon protocol; AFT). The other litters remained with the sow until weaning on Friday morning (morning protocol; MORN). All pigs were moved from the farrowing house to the nursery on Friday morning (Day 0). All pigs were weighed in the farrowing house on Thursday morning, with an average body weight of 6.0 kg at  $21 \pm 2$  days of age. Pigs were subsequently weighed on Days 7, 14, 21, and 28. Feed intake was recorded to calculate ADG, average daily feed intake, and feed:gain.

**Results:** Pigs on the MORN treatment had better feed:gain ( $P < .01$ ) from Day 0

to Day 7 than pigs on the AFT treatment. Removing sows from the farrowing house the afternoon before moving the pigs to the nursery had no effect on ADG, feed intake, or feed:gain for the overall 28-day study.

**Implication:** Under our study conditions, weaning protocol (AFT or MORN) did not affect pig performance.

**Keywords:** swine, nursery, weaning, growth performance

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## Resumen – Efectos del protocolo de destete de mañana o tarde en el desempeño de crecimiento del cerdo

**Objetivo:** Evaluar los efectos en el desempeño del crecimiento de cerdos de destete cuando las hembras salen de la sala de maternidad la tarde anterior al movimiento de los cerdos al destete o la misma mañana cuando los cerdos se envían al destete.

**Materiales y métodos:** En el experimento se utilizaron un total de 542 cerdos a destetar (PIC L327 × L42) de 50 camadas. Cada hembra y camada se asignaron al azar a un protocolo de destete. Para la mitad de las camadas, la hembra se sacó la tarde del jueves, dejando a los cerdos en la jaula de maternidad hasta la mañana siguiente (protocolo de tarde; AFT). Las otras camadas permanecieron con la hem-

bra hasta el destete la mañana del viernes (protocolo de mañana; MORN). Todos los cerdos se cambiaron de la maternidad al destete la mañana del viernes (Día 0). Todos los cerdos se pesaron en la maternidad la mañana del jueves, con un peso corporal promedio de 6.0 kg a los  $21 \pm 2$  días de edad. Los cerdos se pesaron subsecuentemente en los Días 7, 14, 21, y 28. Se registró el consumo de alimento para calcular la ganancia diaria promedio (ADG sus siglas en inglés), consumo de alimento diario promedio, y alimento:ganancia.

**Resultados:** Los cerdos en el tratamiento MORN tuvieron mejor alimento:ganancia ( $P < .01$ ) del Día 0 al Día 7 que los cerdos en el tratamiento AFT. El mover a las hembras de la maternidad la tarde anterior al movimiento de los cerdos al destete no

tuvo efectos en la ganancia diaria promedio, consumo de alimento, o alimento:ganancia para el estudio total de 28 días.

**Implicación:** Bajo nuestras condiciones de estudio, el protocolo de destete (AFT o MORN) no afectó el desempeño del cerdo.

## Résumé – Effets d'un protocole de sevrage en après-midi ou en matinée sur les performances de croissance des porcs

**Objectif:** Évaluer les effets du retrait des truies l'après-midi précédant la mise en pouponnière ou le matin lorsque les porcelets sont mis en pouponnière sur les performances de croissance des porcelets.

**Matériels et méthodes:** Un total de 542 porcelets à sevrer (PIC L327 × L42) provenant de 50 portées ont été utilisés lors de cette étude. Chaque truie et sa portée ont été assignées de façon aléatoire à un protocole de sevrage. Pour la moitié des portées, la truie a été retirée le mardi après-midi, laissant ainsi les porcelets dans la cage de mise bas jusqu'au lendemain matin (protocole d'après-midi; AFT). Les autres portées sont demeurées avec les truies jusqu'au moment du sevrage soit le vendredi matin (protocole du matin; MORN). Tous les porcs ont été déplacés de la maternité à la pouponnière le vendredi matin (Jour 0). Tous les porcs ont été pesés le jeudi matin précédant leur déplacement;

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un poids moyen de 6.0 kg à  $21 \pm 2$  jours d'âge. Les pesées subséquentes des animaux ont eu lieu aux Jours 7, 14, 21, et 28. La prise de nourriture a été enregistrée afin de calculer le gain de poids journalier moyen (ADG), la prise de nourriture quotidienne moyenne, et le ratio nourriture:gain.

**Résultats:** Les porcelets du protocole MORN présentaient un meilleur ratio nourriture:gain ( $P < .01$ ) du Jour 0 au Jour 7 que les porcelets du groupe AFT. Le retrait des truies de la maternité l'après-midi précédant le déplacement des porcelets à la pouponnière n'a eu aucun effet sur l'ADG, la prise de nourriture, ou le ratio nourriture:gain pour l'ensemble des 28 jours de la durée de l'étude.

**Implication:** Dans les conditions expérimentales de cette étude, le protocole de sevrage (AFT ou MORN) n'a pas affecté les performances zootechniques des porcs.

**W**eanling pig acclimatization to the nursery environment is important to ensure good growth performance. The goal is to encourage weanling pigs to make a smooth transition between nursing and eating solid feed after weaning, with minimal interruption in growth.<sup>1</sup> Tokach et al<sup>2</sup> showed that ADG during the first week post weaning had a large influence on subsequent growth performance. Pigs that gained  $> 225$  g per day during the first week were 1.6 kg heavier on day 7 post weaning than pigs that gained no weight during the first week post weaning. This weight advantage increased to 8.0 kg at market (day 156 post weaning), which translates to an advantage of 10 fewer days to market. Removing sows from their litters 12 hours before moving pigs to the nursery may increase pigs' hunger, encouraging a smoother weaning transition. Afternoon weaning also would allow sows to be moved into the breeding barn in the afternoon and not miss being fed the morning of weaning. Therefore, the objective of this study was to evaluate the effects of an afternoon (AFT) or morning (MORN) weaning protocol on the growth performance of pigs.

## Materials and methods

### Experimental design

A total of 542 pigs (initial BW =  $6.05 \pm 0.71$  kg and  $21 \pm 2$  days old; PIC L327  $\times$  L42) were used. On Thursday morning (8:30 AM),

all pigs were weighed and each sow and litter was randomly allotted to a weaning protocol. Balance across treatments was achieved by ranking the litters according to parity of the sow, number weaned, and average pig weight. The two weaning protocols (AFT and MORN) were then randomly assigned within each pair of the ranking. A total of 25 litters were weaned on Thursday afternoon (6:00 PM), with the pigs remaining in the farrowing crates until the following morning. The other 25 sows were allowed to remain with their litters all night. On Friday morning (6:00 AM), litters from both treatments were moved to the environmentally regulated nursery (Day 0). All pigs from the 50 litters were used in the trial. Two weaning groups entered the trial: 26 litters (13 litters per protocol) from the first group and 24 litters (12 litters per protocol) from the second group.

### Housing and feeding

The trial was conducted at the Kansas State University Swine Research and Teaching Center. The Institutional Animal Care and Use Committee approved all experimental protocols used in this study. Farrowing crates (1.52 m  $\times$  2.08 m) had woven wire flooring with a rubber mat under the heat lamp and plastic partitions. No supplemental feed was provided; however, pigs had access to a nipple waterer. In the nursery, pigs were housed six or seven per pen (pen size 1.09 m  $\times$  1.52 m and 1.17 m  $\times$  1.52 m, respectively), with a total of 40 pens per treatment. Weaning protocol treatments were randomly assigned to nursery pens, with a single treatment per pen. Pens had woven wire flooring and one self feeder and one nipple waterer to provide ad libitum use. All pigs were fed a corn-soybean meal diet in a two-phase nursery feeding program. The phase 1 diet, formulated to 1.55% lysine, contained 15% dried whey and 3.75% fish meal, and was fed from Day 0 to Day 14. The phase 2 diet, formulated to 1.45% lysine with no specialty protein sources, was fed from Day 15 to Day 28.

### Data collection and statistical analysis

All pigs were weighed in the farrowing house on Thursday morning (Day -1) and again in the nursery on Days 7, 14, 21, and 28. Feed intake was recorded to determine ADG, average daily feed intake (ADFI),

and feed efficiency (F:G). Nursery pen was the experimental unit for all analyses. Statistical analysis was conducted using the mixed procedure of SAS version 8.1 (SAS Institute, Cary, North Carolina). The statistical model included the fixed effect of treatment and the random effect of wean group.

## Results

The F:G was better (Table 1) from Day 0 to Day 7 for pigs that were left on the sow (MORN) compared with those weaned 12 hours earlier and left in the farrowing crates (AFT). Pigs in the AFT group had numerically greater ADFI than pigs in the MORN group for Days 0 to 7. From Day 0 to Day 14 and Day 0 to Day 28, removing sows from the farrowing house the afternoon before weaning had no influence on ADG, ADFI, or F:G.

## Discussion

In modern swine production facilities, improving weanling pig growth performance has a high economic return because of time constraints within facilities and exit-weight goals.<sup>3,4</sup> Easier transition from the farrowing area to the nursery also has the advantage of requiring less intensive management of pigs (ie, pigs that fail to start on feed) and potentially less size variation. Increasing age at weaning has recently been shown to dramatically improve pig growth, reduce mortality, and increase economic return.<sup>3,4</sup> Other research<sup>5</sup> indicates that high feed intake during the first week after weaning reduces the risk of diarrhea and low growth rate in the nursery period.

In designing our study, we hypothesized that removing the sow from the pigs before weaning would result in pigs being "hungry," and that these pigs would start on feed sooner than conventionally weaned pigs. Our hypothesis was derived from observations in a commercial swine farm that was practicing afternoon weaning and reported good success transitioning pigs from milk to eating dry feed. The managers of the farm thought that the afternoon weaning protocol was increasing feed intake during the first week after weaning. Support for our hypothesis is provided by the data of Bruininx et al,<sup>6</sup> indicating that lighter pigs have a shorter latency to the onset of feeding after weaning compared to heavier pigs. This suggests that lower nutritional body reserves in lighter pigs

**Table 1:** Effects of afternoon (AFT) or morning (MORN) weaning protocol on nursery pig growth performance\*

Parameter †	Weaning protocol		SE	P‡
	AFT	MORN		
Initial weight (kg)	6.1	6.0	0.35	.55
Days 0 to 7				
ADG (g)	135	141	21	.46
ADFI (g)	166	159	11	.17
F:G	1.30	1.14	0.05	< .01
Days 0 to 14				
ADG (g)	257	258	16	.86
ADFI (g)	286	282	12	.64
F:G	1.12	1.09	0.02	.24
Days 0 to 28				
ADG (g)	391	391	9	.96
ADFI (g)	506	504	14	.87
F:G	1.29	1.29	0.01	.50
Final weight (kg)	17.0	16.9	0.57	.73

\* A total of 542 nursery pigs from 50 litters in two trials were randomly assigned to a weaning protocol. Litters were balanced across treatment within trial by number of pigs weaned, sow parity, and average weaning weight. Twenty-five sows were removed from their farrowing crates in the afternoon, leaving the pigs in the farrowing crates (AFT). The other 25 sows remained in the farrowing house with their litters until the next morning (MORN). All pigs in each litter were moved into the nursery that morning (Day 0) and housed in 40 replicate pens per treatment (six or seven pigs per pen).

† ADG = average daily gain; ADFI = average daily feed intake; F:G = feed:gain.

‡ An analysis of variance was performed using a mixed model with a fixed effect of treatment and random effect of trials. Nursery pen was used as the experimental unit for all statistical analyses.

may stimulate the onset of feeding after weaning. Afternoon weaning, with the pigs left in the farrowing crate without access to food, might result in lower nutritional body reserves that would stimulate feed intake.

Ogunbameru et al<sup>7</sup> also looked at weaning in the evening or morning and combined that with or without a 12-hour delay in providing feed. Their objective was to determine whether weaning in the evening might lessen aggressive behavior among newly weaned pigs. Pigs were weaned at an average of 24 days of age. Feed was provided either immediately or 12 hours after weaning to evaluate the concept that hungry pigs would start on feed more readily. In their study, ADG was 6% higher when pigs were weaned in the evening; however, delaying access to feed made no difference to growth performance. In contrast, we observed no difference in pig

growth associated with weaning protocol. Possible explanations may include the difference in weaning ages and the fact that we left pigs in the farrowing house, whereas in the Ogunbameru study,<sup>7</sup> pigs were moved to the nursery at the time of weaning. In addition, we used all pigs in each litter, whereas Ogunbameru et al<sup>7</sup> used only litters of eight pigs. We also housed fewer pigs per pen than is standard commercial practice, which might have altered the dynamics of the transition to eating dry feed. We do note that in many commercial nurseries, supplemental feeding space is provided so that all pigs can eat at the same time during the first days after weaning.

Our results fail to support our hypothesis that removing the sow for several hours in order to make pigs hungry will increase feed intake immediately after weaning. The better F:G during Days 0 to 7 in the MORN treatment group might have been

because of the additional 12 hours that the MORN litters were allowed to nurse. This advantage was not maintained. Thus, our results suggest that weaning time may be scheduled for either early or late in the day to optimize work-flow in the sow farm without influencing nursery growth performance. When pigs are weaned in the morning, sows usually miss the morning feeding in the farrowing house. When pigs are weaned in the afternoon, sows will be in the breeding barn ready for the next morning feeding. An area of future research based on the results of this study is an investigation of whether there is a beneficial impact on rebreeding performance when pigs are weaned in the afternoon and sows do not skip a meal.

## Implication

- Under our study conditions, afternoon or morning weaning protocol did not affect nursery pig performance.

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