PERFORMANCE OF SELECTED PHILIPPINE COMMERCIAL PIGGERY FARMS WEANING AT DIFFERENT AGES

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ABSTRACT

Twenty-four swine commercial farms participating in a three-year monitoring project were grouped as practicing early (n = 3; 21-24 d), moderate (n = 12; 25-27 d) and late (n = 9; 28-31 d) weaning to determine if there are differences in farm performance. Results showed that farms practicing early weaning had better reproductive performance (P<0.05) and gave 3.81 and 2.4 more pigs weaned/sow/year, as well as 1.9 and 1.46 more pigs produced/sow/ year compared to those practicing moderate and late weaning, respectively. However, it was seen that farms practicing early weaning had lower (P<0.05) average weaning weight, adjusted 180-day weight, weight of regular slaughter hogs sold and average daily gain than those practicing moderate and late weaning. Although early weaning improved pigs produced/sow/year by 1.46, this was significantly offset by 0.05 kg lower average daily gain, resulting to comparable weight of pigs produced/sow/year.

Keywords: commercial farms, swine, weaning age

INTRODUCTION

Weaning may be as early as a week old or as late as 42 days. Weaning earlier than 21 days may have negative effects on the piglet, especially if proper environment and nutrition are not provided. Sows may also not be ready for breeding because its uterus has not completed involution as well. On the other hand, weaning beyond 28 days may affect the sow's body condition and its overall longevity (Stalder, 2007) causing a lower farrowing index.

In the United States, weaning age is accomplished at 21.5 days; experiments on earlier age of weaning were attempted (Main, 2004; Patience, 2000; Dritz, 1996; Davis, 2007). Based on several findings, weaning earlier than 21 days results to: (1) greater lipid accretion when offered simple diets (Dritz, 1996); (2) decreased weight sold per pig weaned by 1.8 kg/d with 12 d weaning (Main, 2004);

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(3) spending less time resting and more time active during the over-all nursery phase; and (4) greater average daily gain and gain:feed ration (Davis, 2006). The practice of earlier weaning in combination with segregated weaning is being studied to capitalize the maximum potential for reproductive and productive efficiency of the farms by preparing the piglet's gut and liberating them from pathogens present in the gestating and farrowing site. However, conflicting results occur showing that 28-d weaning with long-day photoperiod was found physiologically beneficial to piglets (Niekamp, 2007); hence, until now benefits of earlier or more than 21 d weaning age remain unclear.

Given the proper timing in weaning, the interest of both the sow and its litter is protected. Vega *et al*. (2010) showed that large farms practicing weaning 1.37 days earlier than small and medium farms, appear to have better weaning to conception interval, farrowing rate, farrowing index, and pigs weaned/sow/year and shorter non-productive days. Considering these preliminary findings, it is necessary to evaluate the performance of commercial farms categorized by the age that they wean their pigs.

MATERIALS AND METHODS

Data used in the study were obtained from twenty-four commercial farms which participated in the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) and Philippine Swine Industry Research and Development Foundation, Incorporated (PSIRDFI) swine performance monitoring project covering the years 2006-2008. The commercial farms were grouped according to the age of weaning: early, 21-24 days (n = 3), moderate, 25-27 days (n = 12) and late, 28-31 days (n = 9). The farms practicing early weaning were generally large commercial piggery farms with an average farm size of 1452.76 sow-level compared to moderate (883.12 sow level) and late (759.37 sow level) weaning. Transformation of parameters using square root method was done as necessary, before statistical analysis was employed. Analysis of variance was used to determine if there were significant differences in the parameters evaluated for the three farm groupings. Means were compared using Duncan's multiple range test.

The production parameters evaluated were average birth weight (ABW), average weaning weight (AWW), adjusted 30-day weight (A30DW), adjusted 90-kg age (A90A), adjusted 180-day weight (A180DW), average age of regular slaughter hogs sold (AARSHS), average weight of regular slaughter hogs sold (AWRSHS), farm efficiency (FE), average daily gain (ADG) and weight of pigs sold/sow/year (WPSY). The reproduction parameters included litter size born alive (LSBA), age at weaning, litter size at weaning (LSW), pre-weaning mortality, pigs weaned/sow/year (PWSY), pigs produced/sow/year (PSY), farrowing rate (FR), farrowing index (FInd), nonproductive days (NPD) and weaning to conception interval (WCI).

The percentages of ration used (*e.g*., booster, prestarter, starter, grower, finisher feeds) were analyzed. The price based parameters were average unit price per kg of total feed cost (AUPTFC) and feed cost per kg of live animals (FCKLAS).

RESULTS AND DISCUSSION

The profile of surveyed farms show that large commercial piggery farms were practicing early weaning. Farms practicing moderate and late weaning were also large commercial piggery farms because they had more than an average of 750 sow level. Earlier weaning was practiced by large commercial swine farms perhaps because they had access to several farm sites and better financial condition to buy booster feeds as supplement for nursing piglets.

All production parameters were significantly different between farm groups practicing early, moderate and late weaning, except ABW, FE and WPSY (Table 1). Farms practicing early weaning had significantly higher A30DW than late weaning (8.86 kg vs 7.94 kg). However, the A180DW was significantly lower in early compared to late weaning ages (89.15 kg vs 97.34 kg). The AWRSHS sold were 83.59 kg, 87.95 kg and 86.58 in early, moderate and late weaning, respectively. The ADG of early, moderate and late weaning ages were 0.49, 0.52 and 0.54 kg/day, respectively. Weaning at a younger age causes a significantly lower A180DW, hence, significantly longer production days until market weight is reached, consistent with significantly lower average daily gain. The AWRSHS by farms practicing early weaning was lighter but on the average, was older than 10 days compared to pigs from farms practicing late weaning. Pigs weaned at an older age are heavier and have more developed digestive system. On the contrary, younger

Table 1. Production performance of commercial farms practicing early, moderate and late weaning.

Parameters	Weaning age in days			SEM
	Early (21-24d)	Moderate (25-27d)	Late (28-30d)	
Sow level	1452.76	883.12	759.37	96.54
Average birth weight (kg)	1.46	1.47	1.46	0.01
Average weaning weight (kg)	6.95^{b}	7.20^{b}	7.76^{a}	0.09
Adjusted 30-day weight (kg)	8.86^{a}	8.02^{b}	7.94^{b}	0.09
Average 90-kg age (days)	182.89^{a}	177.75^{a}	167.21^{b}	2.21
Adjusted 180-day weight (kg)	89.15^{b}	93.96^{a}	97.34^{a}	1.03
Age of regular slaughter hogs sold (days)	171.45^{a}	169.57^{a}	160.10^{b}	1.78
Average weight of regular slaughter hogs sold (kg)	83.59^{b}	87.95^{a}	86.58^{ab}	0.81
Farm efficiency (FE)	3.51	3.64	3.41	0.09
Average daily gain (kg/d)	0.49^{b}	0.52^{a}	0.54^{a}	0.01
Weight of pigs produced/sow/year (kg)	1480.14	1379.09	1449.82	33.37

In rows, means with different superscripts are different at $P<0.05$ level of significance.

pigs may digest feed less efficiently resulting to slower growth which may affect its performance during the growing-finishing stage. Similarly, it was seen by Cabrera *et al*. (2010) that there was a linear relationship between weaning weight and post-nursery phase of growth.

Farms practicing early weaning had higher A30DW (8.86 kg) than in moderate (8.02 kg) and late weaning (7.94 kg), respectively, older average age at 90 kg (182.89 days) than late weaning (167.21 days) and older age of slaughter hogs (171.45 days) than late weaning (160.10 days). The A30DW was higher in farms practicing early weaning because the age at weaning becomes the divisor in the formula, and thus, the younger the age, the smaller the divisor. Older age at 90 kg at slaughter implies that for farms practicing early weaning, pigs are grown for a longer period of time before the slaughter age is reached. On the other hand, FE and WPSY were not significantly different between farm groups. This is because the PSY in farms practicing 21-24 days weaning was high, and therefore, contributing to the total weight of animals sold.

Weaning is the cue for the next estrus cycle and breeding. If the animal conceives, it farrows at 114 days. After farrowing, the sow nurses an average of nine piglets and the dam immediately undergoes recovery of the uterus, ovary and brain in preparation for the next estrus. The nursing of the piglets serves as nourishment for the young and helps prepare the sow to recover, because the suckling mechanism of four or more piglets provides a negative feedback to the brain to stop ovulation by suppressing the follicle stimulating hormone (Flowers, 2002). It takes about 21 days for the uterus to return to normal size and tone. During the lactation period, the sow generally experiences negative energy balance because it is during this period when the feed consumption cannot provide the requirement for milk production and recovery of the reproductive organs, hence the dam derives its energy from the body's reserve. Thus, the depletion of the sow's energy reserve because of late weaning results to longer weaning to conception interval, farrowing interval and nonproductive days. Thus, PWSY and PSY decrease correspondingly.

The reproduction parameters are shown in Table 2. The results revealed that LSBA (9.49), LSW (8.94), FR(78.43) and FInd (2.40) were higher ($P<0.05$) in farms practicing early weaning compared to farms practicing moderate and late weaning. Based on this study, farms weaning at 21-24 days maximize the reproductive efficiency of their sows. Sows weaned at the said time are physiologically prepared for the next breeding because excessive weight loss was prevented. Also, the uterus has fully recovered and is ready for implantation, resulting to lower embryonic mortality. Farms practicing early weaning have 3.81 and 2.4 more PWSY as well as 1.9 and 1.46 more PSY compared to those weaning at 25-27 and 28-31 days, respectively. NPD, farrowing interval and WCI were also shorter in farms engaged in early weaning. Pre-weaning mortality was lowest in farms practicing early weaning, and this may be attributed to a more uniform weight among the piglets in a litter resulting to a greater number of LSW (See, 2005).

Farms practicing early weaning utilize significantly more ($P<0.05$) booster (3.33%) starter (21.65%) and finisher (13.98%) rations compared with farms using moderate and late weaning (Table 3). Together with early weaning is a dietary change attuned to the needs of the piglets. Provision of booster feeds at an early

Table 2. Reproductive performance of commercial farms practicing early, moderate and late weaning.

Parameters	Weaning age in days			SEM
	Early	Moderate	Late	
	(21-24 d)	(25-27d)	(28-30d)	
Litter size born alive	9.49[a]	9.07[b]	8.96[b]	0.06
Weaning age (days)	23.43[a]	26.96[b]	29.38[c]	0.18
Litter size at weaning	8.94[a]	7.96[b]	8.28[b]	0.09
Preweaning mortality (%)	5.75[b]	11.88[a]	7.20[b]	0.69
Pigs weaned/sow/year	21.49[a]	18.31[b]	19.09[b]	0.21
Pigs produced/sow/year	17.69[a]	15.73[b]	16.23[b]	0.36
Farrowing rate (%)	78.43[a]	74.10[b]	74.98[b]	0.79
Farrowing index	2.40[a]	2.30[b]	2.31[b]	0.01
Nonproductive days (days)	19.21[b]	33.20[a]	21.36[b]	2.44
Weaning to conception interval (days)	11.25[b]	15.17[a]	14.37[a]	0.64

In rows, means with different superscripts are different at P<0.05 level of significance.

Table 3. Means and standard error of mean (SEM) of percent feed ration used, feed cost and unit prices.

Paramaters	Weaning age in days			SEM
	Early	Moderate	Late	
	(21-24 d)	(25-27d)	(28-30d)	
Feed Ration (%)				
Booster	3.33[a]	1.22[c]	1.95[b]	0.17
Prestarter	9.12[b]	10.56[a]	10.82[a]	0.31
Starter	21.65[a]	16.59[b]	10.34[b]	0.83
Grower	28.49	31.26	29.49	1.16
Finisher	13.98[a]	11.96[a]	6.10[b]	1.20
Breeder	13.13[c]	18.73[b]	23.33[a]	0.71
Lactating	9.19	9.69	9.94	0.38
Feed Costs				
Feed cost per kg	17.26[ab]	16.71[b]	18.09[a]	0.25
Feed cost per kg live animals sold	59.33	58.77	60.57	1.55

In rows, means with different superscripts are different at P<0.05 level of significance.

age prepare and train the piglets in taking in more solid food and to be less dependent on milk. It is important for the piglet to consume more solid food before

weaning so it can easily stabilize its digestion following weaning (English *et al*., 1977). To support the pig's growth, farms practicing early weaning gave more high protein feeds in the form of starter diet at the time or age where nutrients are devoted for muscle development. It may be seen, however, that since pigs weaned at 21 days are marketed at an older age and stay longer in the farm, there is also an increased proportion of finisher feeds. Dritz *et al*. (1996) said that increasing diet complexity improved ADG in the early period after weaning only. There was no significant difference in FCKLAS sold between farm groups. FCKLAS was seen to be highest in farms weaning at 28-31 days of age.

In conclusion, farms practicing early weaning (21-24 days) had better reproductive performance and pigs weaned and produced/sow/year. However, because weaning weight affects post weaning growth, pigs weaned at an earlier age had lighter weights and consequently slower ADG. Although early weaning improved pigs produced/sow/year by 1.46, this was significantly offset by 0.05 kg lower ADG, resulting to comparable weight of pigs produced per sow per year.

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